

NEWS IN PERSPECTIVE

MANAGEMENT VIEW

"WELCOME, SALESMEN!"--That friendly feeling toward supplier representatives appears to be growing, as more and more buyers find more ways the better-equipped, better-informed sales reps of today can be more helpful. Example: PG&E has produced a new booklet to spell out its meaning of "welcome"--see page 49. (Another: the City of Chicago has a new pamphlet, "How to Sell the City of Chicago"--how potential vendors may participate in a \$120-million market for the city's needs.

ANNIVERSARIES PAY OFF--When an electric company comes up to a corporate birthday, some officials are strictly nostalgic, but others are (or should be) pretty commercial. This is a good bet for valuable public promotion, so make the most of it! This summer, at least two power companies (Pennsylvania P. & L. and Pacific P. & L.) did--see page 43.

HEAT PUMP STANDARDS must be uniform if development of the heat pump is to be rapid and orderly and use and acceptance is to be achieved, the general sales section of the Southeastern Electric Exchange has concluded. Adopting a resolution recently, they have urged manufacturers to adopt and comply with such comparable ratings.

"THERE ARE FEW ORGANIZATIONS that have done more for the Cuban people than Cuban Elect. Co.," said Henry B. Sargent, president of American & Foreign Power and board chairman of the Cuban property, after the Castro government seized it last month. He added: "It is hoped that at some time in the future political and economic conditions will again permit the company to contribute to Cuban progress."

GROUP TRAVEL RESTRICTIONS are imposed

on executives in less than half (42-percent) of 275 companies surveyed recently by the NICB. But, even many of those without formal restrictions follow a practice of avoiding scheduling air trips together for top executives where feasible. And, says NICB, increasing needs for travel cause more and more managements to take a new look at their practices from time to time.

ECONOMIC CLIMATE

IMPACT OF FEDERAL SPENDING on the economy is difficult to assess at present. It seems clear that there will be an increase in defense costs in the current fiscal year--probably by at least \$1-billion and maybe more. Presidential nominees have made it clear that the present Administration's policies of careful restraint and the taking of calculated risks will not be rigidly followed. Another defense money bill is likely to be put through Congress fairly early in 1961.

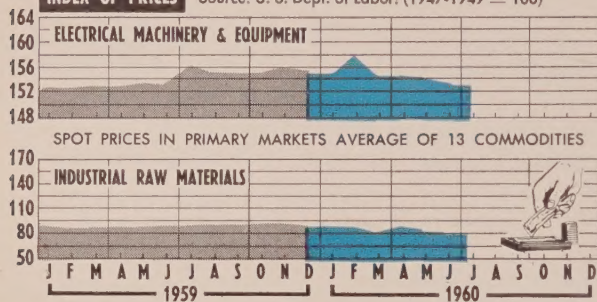
THE FEDERAL CASH BUDGET in fiscal 1961--a better measure of economic significance than the fiscal budget--may show a slightly deflationary surplus. More money will be voted for defense, but not too high a proportion of the new funds will actually be spent during the year. Concurrently, the various federal trust funds, which do not figure in the fiscal budget, will have \$1.3-billion more income than outgo. In fiscal 1960, the government ran a cash surplus of \$700-million; its budgetary surplus was figured at \$1.1-billion.

PUBLIC UTILITY CONSTRUCTION over this year shows a mixed outlook, the Commerce Department says. Electric power and oil pipeline building will drop moderately, but substantial increases are expected from gas utilities, railroads, and tele-

MARKETING GUIDEPOSTS

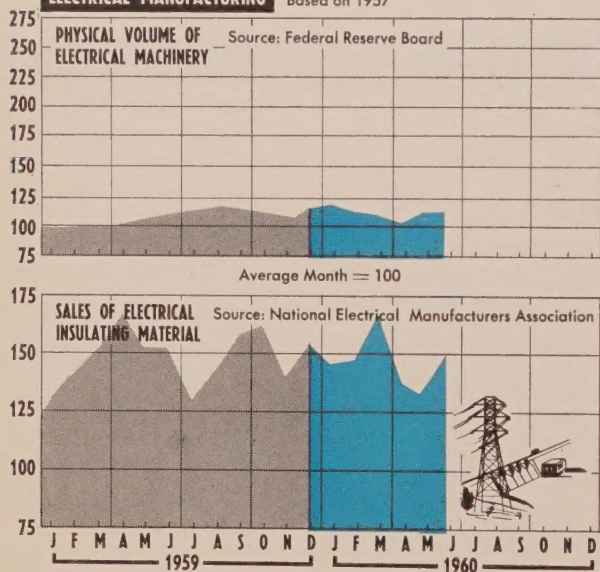
INDEX OF PRICES

Source: U. S. Dept. of Labor: (1947-1949 = 100)



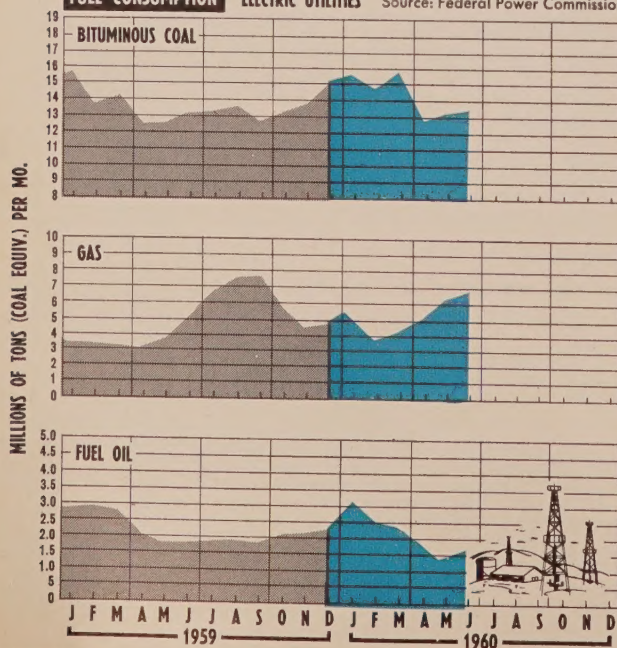
ELECTRICAL MANUFACTURING

Based on 1957

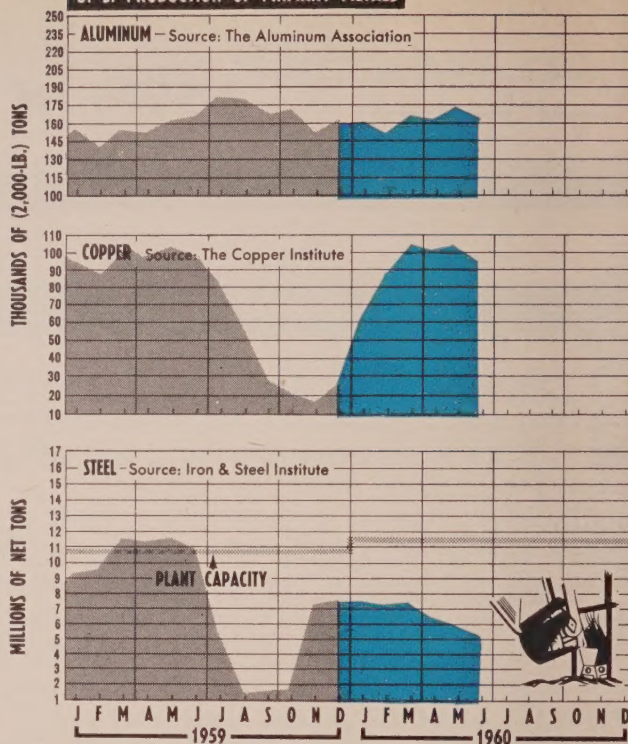


FUEL CONSUMPTION

ELECTRIC UTILITIES Source: Federal Power Commission

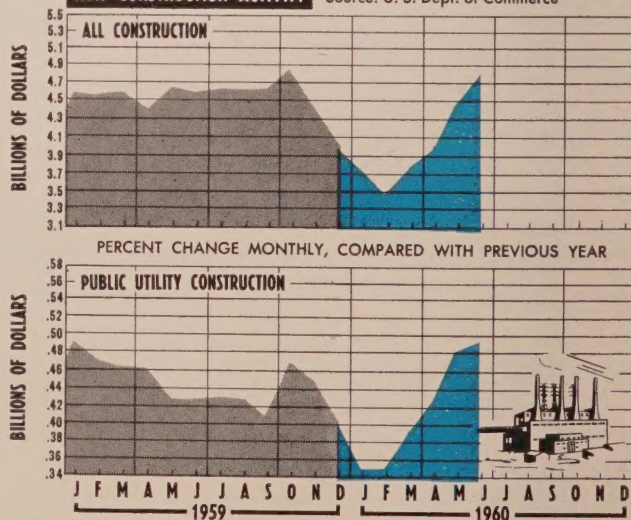


U. S. PRODUCTION OF PRIMARY METALS



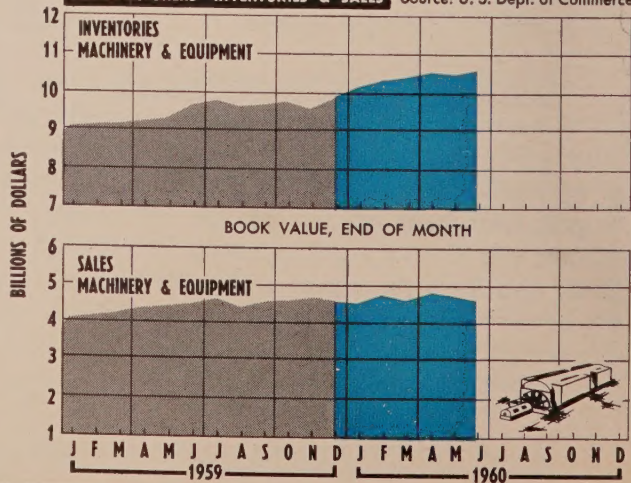
NEW CONSTRUCTION ACTIVITY

Source: U. S. Dept. of Commerce



MANUFACTURERS' INVENTORIES & SALES

Source: U. S. Dept. of Commerce



phone companies. On the whole, a modest gain is expected--and the total will be within one-percent of the \$5.4-billion high reached in 1957. Long-term outlook is upward, though yearly gains may be interrupted by the completion of cyclical 3-and-4-year programs. Electric power utilities alone are expected to spend \$1,925,000 on construction in 1960 compared with last year's \$2,072,000.

WASHINGTON INFLUENCE

NEW FPC FORECASTS of peak demands of electric utility systems show a rise to 380-million kw by 1980 with about 437-million kw of installed generating capacity needed to meet these requirements. The FPC staff estimates that non-utility generating capacity will total 30-million kw. This will bring total capacity to about 467-million kw in 1980 compared with 174-million kw at the end of 1959. (FPC's last report, issued less than a year ago, predicted a total capacity in 1980 of 451-million kw, or 16-million kw less than the new estimate.) Biggest rises were 6-million kw in the Northeast and 4-million kw in the Southwest. The staff used a reserve allowance of 15-percent added to expected peak loads. In the new estimate, 1980 hydro capacity has been revised upward from about 58-million kw to nearly 69-million. Steam electric capacity was raised from 382-million kw to 390-million kw. Nuclear plants fall within the latter group, but FPC did not predict 1980 capacity because of many uncertainties. Alaska and Hawaii have not yet been included, but a rough estimate of the new states gives 400,000 kw for Alaska and 500,000 kw for Hawaii at the end of 1959.

STRAIGHT-LINE DEPRECIATION was used by about 92-percent of major privately-owned electric utilities at the end of 1958, according to FPC. Of the 263 class A and B electric companies, 4-percent used interest methods, 3-percent the retirement method, and 1-percent the revenue method. "Electric Utility Depreciation Practices, 1958" is for sale by the Superintendent of Documents, U.S.

COOSA RIVER HYDRO PROJECT, to cost \$40,986,000, has been authorized by FPC. The amended license to Alabama Power Co. excludes the unconstructed Wetumpka development and substitutes Jordan No. 2. The new development will include two 75,000-kw generators, with provision made for a third. The Commission also amended licenses for the Mitchell development and Jordan No. 1. Mitchell's generating capacity will be increased by 65,000-kw at an estimated cost of \$10-million and Jordan No. 1 will increase by 19,000-kw at an estimated cost of \$740,000.

TVA PURCHASES totaled \$484,328,000 for the last fiscal year. About \$328-million--more than 2/3 of the total--went for coal. (The former record was \$136-million in fiscal 1952.) Money spent for manufactured articles (generators, turbines, transmission lines, etc.) reached \$140-million. Of this, 18 percent went to Valley-state companies, 73 percent to companies in other states, and 9 percent to foreign firms.

ALASKA'S FUTURE electric growth--aside from generating capacity at military installations--is estimated by FPC as increasing from 108,000 kw at the end of 1957 to 356,000 kw in 1980. The report, made at the request of Army Engineers, noted Alaska's enormous hydro potential and possibilities for development of industries to use power from some of these major sites. If such development occurs, normal load growth estimates would be much too low.

NATURAL GAS IMPORTS from Canada to Pacific Northwest and California markets has been authorized by FPC. More than 500-million cubic feet per day can be brought in from Alberta reserves. The gas will be sold or transported from Canada by five Canadian companies, two of which are wholly-owned subsidiaries of U.S. utility firms. Three U.S. companies--Montana Power, El Paso Natural Gas, and Pacific Gas Transmission Co.--will import about 213.3-billion cubic feet annually. The entire international project, including facilities to be built in California,

has been estimated to cost more than \$400-million. The American companies must file annual reports showing monthly and peak-day volumes and average monthly prices of imported gas.

JOINT U.S.-CANADA PROGRAM is planned for development of heavy water moderated power reactors. Both countries agree to cooperate in research and development already underway. AEC will undertake further R&D for perhaps as long as 5 years at a maximum cost of \$5-million. It will be specifically directed toward reactor to be built by Canada. The program will continue for at least 5 years beyond initial operation of the CANDU reactor.

INDUSTRY SIFTINGS

CORDLESS APPLIANCES--threat to plug-in type devices? Gould-National Batteries hope for expansion in the household and office fields to the tune of \$75-million by 1965, but this should be little competition for even the conventional lead-acid battery business, running around \$625-million a year. And, even the battery devices need plug-in recharging, so utilities can sit back and watch the market tussle, however it develops.

SOLID-STATE CIRCUITRY throughout new electronic scanning systems performing control functions from a central station allow completely unattended operation of power substations, announced Lynch Communications Systems, Inc. of San Francisco. Designated the Lynch B-1000 series, it utilizes a form of time-division multiplexing for coding each function, repeating continuously at rates up to 3000 "bits" per second.

STARTING THIS WEEK and continuing for four weeks, a million dollar light bulb sales push will be underway--"a five-point point-of-purchase selling system," says General Electric. Following up on a highly successful Spring campaign, GE is again employing the magic of nearsighted Mr. Magoo, who is a political candidate

under the campaign slogan, "Vote for Magoo--and GE Bulbs, Too!"

SANGAMO'S CHANGEOVER TO NEW J3 meter production from the company's J2 design is now complete, and production of the new design with magnetic flotation is on schedule, according to Pres. C. H. Lanphier. Sangamo's V-P and manager power equipment, James H. Patton, reports that "shipping tests are now concluded and verify our expectations of the J3 with regard to stability of accuracy."

PALLETIZED LAMP SHIPMENTS are saving users of 300 to 1000 fluorescent lamps at a time the equivalent of 10-cents a lamp, reports GE. One user cut relamping time by 25-percent using pallet loads.

SPRINKLER SYSTEM PIPING for a 30-acre lawn area in a new Oklahoma City plant site, made of plastic, has saved thousands of dollars, says Republic Steel, makers of the SRK plastic pipe. But in another area, Designer Chas. W. Jones says new plastic materials are needed to solve illumination problems.



LOOKING AHEAD... FINANCIALLY

--From Irving Trust

Financing picks up again the end of this month, after light scheduling in August. To round out the third quarter of financing for electric companies, there was some \$277-million in bonds, \$50-million in preferred and only a small amount of common coming in September.

For the fourth quarter little was lined up for gas utilities, but electric financing was up to about \$283-million, scheduled by mid-August. The calendar is free of conflict and congestion.

The U.S. Treasury will not be in the market for new funds until October, though advance funding operations were expected earlier, with a favorable market. After an amazing performance this summer, the municipal bond market developed a definitely strong tone as of early this month.

Electric House Heating: Next NEMA Meet in 1962

A national look at the status of electric house heating—taken so successfully by the equipment manufacturers for the first time this Spring—will not be available again until March of 1962.

The sponsoring organization, the Electric House Heating Section of NEMA, has announced that its Second National Electric House Heating Symposium and Exposition is now being planned for March 19-21, in Chicago's Sherman Hotel. Although an exposition for 1961 had been considered, members of the NEMA Section concluded that time was too short to arrange the type of program requested by the more than 3000 people who attended the first program.

Proceedings of the First Symposium and Exposition, including complete texts of all addresses given during the 3-day NEMA conference, are now available in a 232-page book. Copies of the proceedings, at \$5.00 for single copies and discount prices for quantities, may be ordered from NEMA through R. D. Smith, secretary of the Association's consumer products division.

"You Can't Beat Electric Heat."—The NEMA Section has announced the availability of bumper stickers with this message printed in white and red on a black background. The adhesive-backed stickers are 14½ inches long and 4 inches wide, and sell for \$8.00 per 100 copies.

The 1962 Symposium and Exposition, according to sponsoring manufacturers, will emphasize and detail such electric house heating specifics as the proper installation of equipment, requirements and installation techniques of various types of insulation materials, electric house heating for both new and remodeled homes, and case histories on the use of electric heat and its advantages

ELECTRIC HEATING PREFERRED—Largest concentration of electric heating in Missouri is a Union Electric-supplied subdivision, where 97-percent of the first group of 154 homeowners selected electric heating as their choice. Now, 650 more homes will be added, with Westinghouse supplying baseboard heating and appliances for the Total Electric Gold Medallion Homes. And, in Illinois, Central Illinois P.S. Co. reduced its rate for residential electric space heating from 1.85 to 1.75-cents per kwh, the increasing use making the reduction possible. In Newark, N. J. next month, P.S. Elect. & Gas will stage its fourth annual Residential Electric Heating Show, bringing together manufacturers, distributors and electrical contractors to help keep the public informed of the convenience of the use of electricity.

over other methods of heating. The program also will feature a review of the most effective electric heating promotions being employed by the industry as a whole, by individual manufacturers, distributors, commercial power companies, REA cooperatives, municipal power companies and by TVA and other organizations.

The NEMA Section has indicated that it will begin to pin-point program topics in the near future following an analysis of replies from exhibitors and conferees at the 1960 program to questionnaires asking for comments on the first exposition and "suggestions for staging an even better event in 1962." NEMA also notes that highlights of the Section National show will be announced as plans progress.

In a related development in this field, electric heat pump manufacturers have been urged to adopt and comply with uniform rating standards. A resolution citing the need for comparable heat pump ratings by the various manufacturers was adopted by the General Sales Section of the Southeastern Electric Exchange.

The action was taken at the recommendation of the SEE Heat Pump Task Force Committee which previously had conferred with repre-

(Continued on page 44)

How Two Utilities Make Birthdays Pay

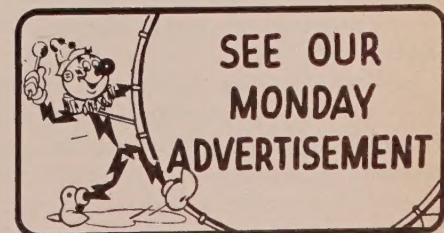
If you travel across this aging, nostalgic-minded nation of ours a bit, anniversary celebrations may appear pretty "old hat"—they occur often and almost anywhere these days. But, never mistake it, their value locally as promotion lodestones is considerable, at least potentially.

Electric power companies are in a specially advantageous position to capitalize on the possibilities for promoting good will through the anniversary commemoration, of course . . . and many of them do



outstanding jobs. For example, this year, two utility companies with the initials P. P. & L.—one in the East and one out West—have seen to it that company birthdays paid off promotionally.

Pacific Power & Light Co. in Portland, Oregon, has concentrated on the proven acceptability of a special community newspaper supplement to develop interest on the



part of newspapers and allied appliance trades in the utility's system service areas. Pacific Power titles its supplement, "50 Years of Electric Living", in which it not

(Continued on page 44)

Birthdays Pay—*from p. 43*

only reviews the wonders of the electrical age, but in separate editorial items treats such diverse subjects as the company's contributions to area recreation facilities, industrial development and research in science and technology for future demands on its services.

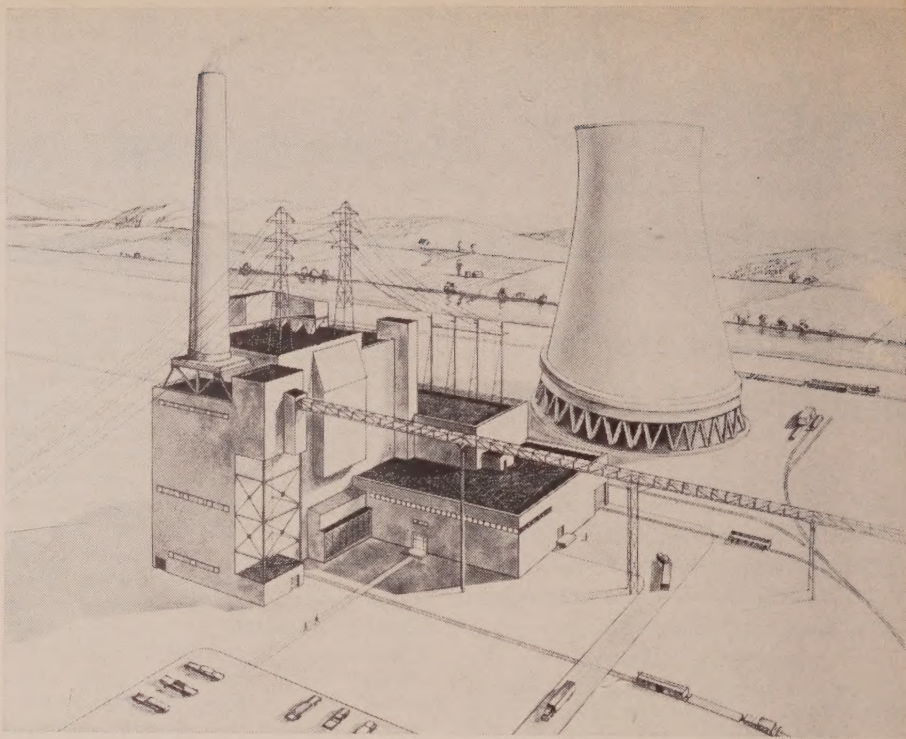
The Pacific Power newspaper supplement was packaged on a "bonus advertising lineage" incentive plan with editors and publishers having the option of using four, six or eight pages, depending upon the amount of local supporting advertisements they develop. Pacific Power's commitment is for 25-percent of the normal space allocated to display copy.

According to Pacific Power's news director, James H. Ferguson, a lot of solid leg work went into the assembling of the original material, the anecdotes and history and the photographs spanning the development of the utility industry, the company and its predecessors. He notes: "Many of the old photographs provided by veteran employees would be classics in any photographic history of our industry. We have also been making very effective use of them in 'Family Album' pages of our Company employee Bulletin during 1960."

Employee or customer . . . "you" were a part of your power company's anniversary celebration, if you live in the 20-percent of Pennsylvania served by Pennsylvania P. & L. Co. P. P. & L. planned it that way, aimed a three-month program at its own people, while making certain that everyone in its 10,000-mile square territory is aware that the utility is 40 years old this year.

In June, according to P. P. & L.'s advertising and publicity manager, W. H. Rodgers, Jr., the program was highlighted by a series of get-togethers for employees and their families and friends scheduled through the three month period. A travelling "circus-type" show, the open-house event is featuring tours of Company facilities, displays and exhibits, refreshments and prizes and souvenirs.

To kick off the program, P. P. & L. ran a special 7-column, 18-inch newspaper advertisement in daily newspapers throughout its 10,000-



"The thing" in the background is the first cooling tower of its kind in the Western Hemisphere. Of concrete construction and hyperbolic shape, Kentucky Power Co.'s proposed tower will condense steam for the utility's new 265,000-kw Big Sandy Plant, for which ground was broken in August. The tower will rise 320-ft above the ground, with a base diameter of 245-ft tapering to 140-ft at the top.

square-mile territory. The advertisement featured the "bargain" element of electricity in terms of the many advantages it has brought to P. P. & L. users during the past 40 years. One column headlined, "The Score for Two Score Years," lists the contributions electricity has made to modern living since 1920:

"In the forty years P. P. & L. has been in business, there has been a continuing pattern of rate reductions for household electric service—and only one little rate increase. In fact, under today's electric prices, you, of course, use many things that could not possibly be afforded at the rates of years ago. An electric bill of \$10 for two months' service would have been over \$15 if 1920 rates still applied. Today's \$20 bi-monthly bill would have been over \$46."

Looking back to the early years, P. P. & L.'s ad reminisced: "When service came, it was celebrated with community parades and brass bands. Who, in each household would be first to turn a switch was a significant honor."

For six days prior to the appearance of this advertisement, the Company ran six "teaser" advertisements (examples illustrated) which added dramatic value and

drew attention to the main advertisement.

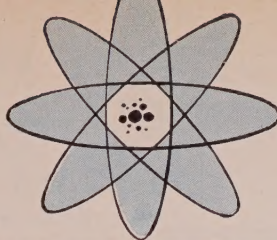
P. P. & L. also used a news story which was released to all service area newspapers to point up the Company's anniversary and also its accomplishments in the area of rural electrification. (For its outstanding record, P. P. & L. has been cited twice nationally.)

The news story lead, which briefly outlined the Company's history was rewritten for each area to include localized historical background; a treatment which undoubtedly added substantially to newspaper acceptance, noted Mr. Rodgers.

House Heating—*from p. 43*

representatives of several manufacturers on heat pump sales and service problems. Manufacturers were asked to support the efforts of the American Refrigeration Institute in "the early development of standards for the package central system heat pump and compliance with such standards as a means of uniformity of the manufacturers' rating methods and performance.

The SEE Sales group declared: "We believe this is necessary to the rapid and orderly development, use and acceptance of the electric heat pump in the Southeast."



Controlled nuclear chain reaction is achieved by bringing together these two sections of a new 25-ton nuclear assembly at General Dynamics' General Atomic Div. facilities in San Diego. The low-power assembly was designed and built to study the nuclear core characteristics of the High Temperature Gas-Cooled Reactor (HTGR).

SEPARATION OF WATER FROM STEAM produced in nuclear reactor systems will be done within the reactor vessel, if a Genreal Electric experimental program underway since 1958 is successful in producing designs of more compact, high capacity separator equipment. Elimination of the external vessel and associated piping generally used for steam separation in forced circulation boiling water reactor plants will result in reduced plant capital costs, according to GE project engineers. Performance of experimental steam separators is now checked in a special test loop facilities at San Jose and at PG&E's Moss Landing Power Plant, and internal steam separation equipment has been proposed for the 50,000-kw improved cycle boiling water reactor which the cities of Los Angeles and Pasadena are to operate for AEC.

YANKEE OPERATING PERMIT, granted provisionally in July, will be made final for full power operations only after another public hearing. Meanwhile, Yankee officials are to file a report on the reactor's behavior after 500 hours at operation at up to 392,000-kw (thermal) level.

PRIVATE IRRADIATION SERVICES—for experiments with prospective fuel elements and reactor core elements and for testing various materials under pressures and temperatures occurring in nuclear reactors—must be used by commercial firms and private institutions, unless such privately-owned facilities “are not reasonably available.” Says the AEC, “Private facilities are now available . . . and should be able to perform all desired commercial irradiations. (This) is in line with the Commission's general policy to reduce and

eventually eliminate its sales and services in fields where industrial sources become reasonably available.”

INTERNATIONAL COOPERATION GROWS—Amendments to “Agreements for Cooperation” in the civil uses of atomic energy, signed by the U. S. and 11 other countries this summer, facilitate the distribution of special nuclear material information and data. And, as part of the program aimed at improving the performance of reactors to be constructed under the joint U. S.-Euratom Reactor Program, contracts for research and development work to cost \$7.8-million have been negotiated between 28 community and 10 U. S. organizations.

TAX BURDEN ON THE ATOM—Newest account of what the new atomic powerplant does to the economy of the usually somewhat isolated area it comes to is datelined Rowe, Mass. Here, (as at Indian Point, N. Y. and other sites), the project is distinguished locally by the way it picks up a big share of the nearby town's tax load, boosting the community's property valuation in this case, from about \$700,000 by some \$5-million. Result: average bite per person is cut to less than half of pre-atom era.

NUCLEAR POWER “FACT BOOK,” being distributed by the Electric Companies Public Information Program, asserts that “the U. S. reactor program—designed to test systems, not primarily to produce kilowatts—has established a foundation for leadership which, in terms of diversity and output of technological data, should be permanent.” (Books are available from PIP for \$2.50 for 10 copies.)

A MATERIAL'S METALLURGICAL CONDITION largely determines the radiation stability of an alloy, such as uranium-10-percent molybdenum used in prototype fuel pins, according to a group of APDA representatives who recently presented an ASTM paper on irradiation testing of Enrico Fermi fuel in the CP-5 reactor.

THE UK'S ATOM POWER PLAN has been cut, in dollar value, from \$1.48-billion to \$336-million, according to a recent “N. Y. Times” story. Slow-down of the “acceleration” would still include completion of seven plants by 1966.

TOO MANY MEETINGS?—Atomic industrial Forum directors, 17 of them, think so. AIF members have received a letter from them aimed at checking agreement or disagreement with this view. Who should sponsor the meetings that are necessary? The Forum, and the American Nuclear Society, the AIF feels.

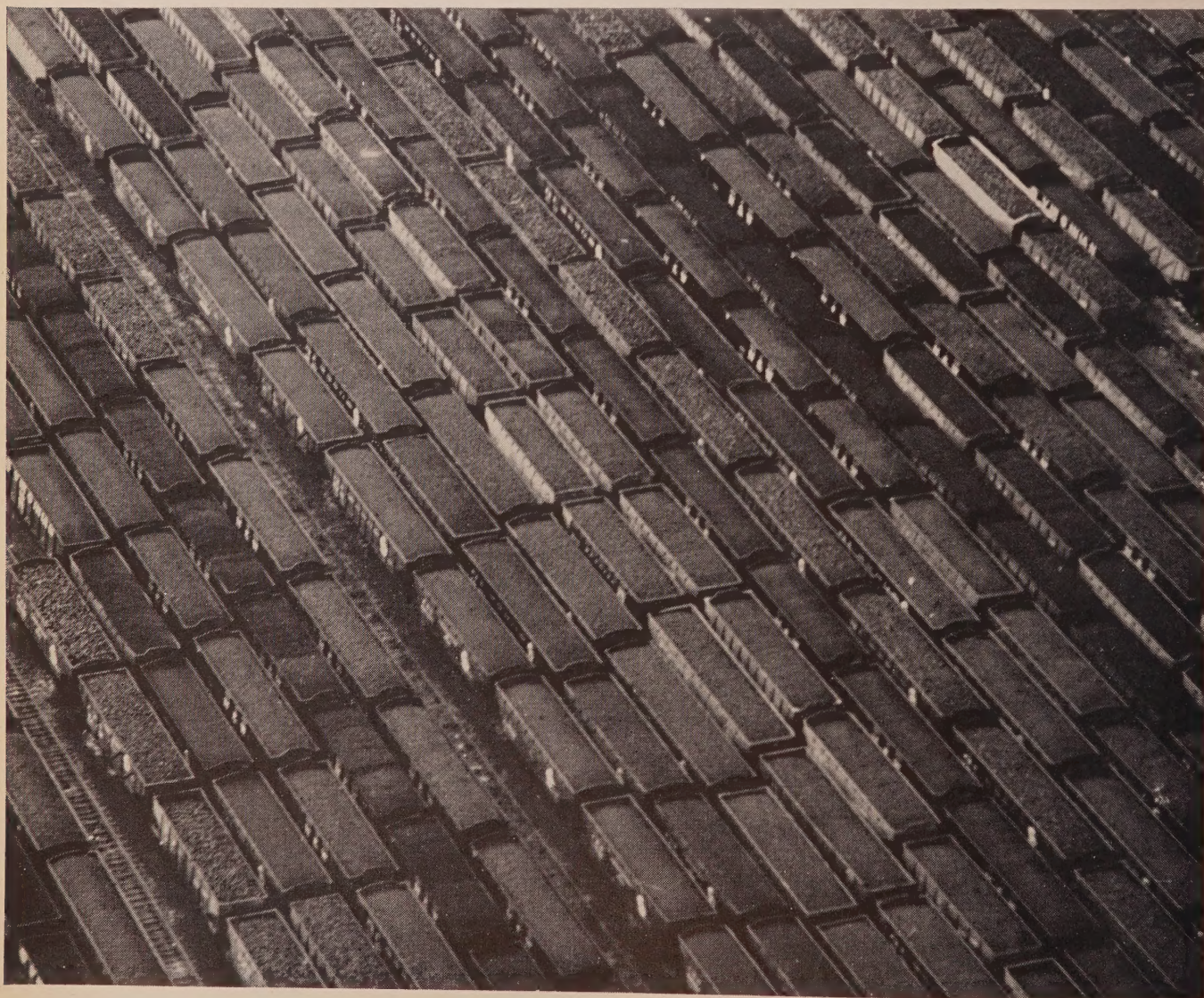
how long?...10 years?...20?...50?

(A utility needs to know!)

There has never been much room for short-term thinking in the utility business. But probably never before have utility executives and engineers been taking the *long look* in so many operating areas.

Take coal, for instance. They've been asking themselves and their coal suppliers some pointed questions: "Can we count on these suppliers to deliver the kind and quantity of coal we're going to need in the years ahead? Have they adequate reserves?

Is this coal costing us over and above its invoice price in excessive coal handling, ash handling, equipment outages, freight charges on inerts? Or is it coal that eliminates these frequently overlooked incremental costs, delivers highest operating efficiency and steam at the lowest cost?" The answers you'll get to such questions from Island Creek are the kind that let you plan ahead with confidence. We at Island Creek would welcome a chance to sit down with you for a thoroughgoing discussion. Write, wire or phone.



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by RALPH ELLIOTT

Washington Editor

Variation On A Theme

The not inconsiderable success attained over the past three decades by the forces working for socialization of electric power in this country can be attributed largely to the fact that those forces have been able to hitch their public power schemes to legitimate governmental functions—primarily flood control, irrigation and reclamation. Rapid as it has been, though, the spread of government power as a by-product of these functions has been altogether too slow for the would-be socializers.

Now they have come up with a new approach of the devious variety, which they see as a likely means for stepping up the pace of their crusade. It entails simply the build-up of another federal peg on which to hang their public power plotting. That peg is the impending national shortage of fresh water supply.

Fragmentary evidence of what was brewing along these lines popped up here and there over the past year or so. But the real kick-off in the build-up came in a recent presentation to the powerful Senate Select Committee on Water Resources by what has become the most brashly vocal government power front—the National Rural Electric Cooperative Association.

The presentation, made by NRECA staff engineer C. A. Robinson, Jr., was monotonously typical in its attempt to weave a concealing mantle of “national interest” around an obvious public power pitch. It seems noteworthy, however, as an example of the kind of double-talk likely to flow from such sources as concern over the water problem heightens.

First came a picture of electric co-ops’ soaring needs for additional power, followed by the contention

that co-ops can buy from federal power marketing agencies 60% more wholesale energy per dollar spent than they can from private utilities. “Rural electrification cannot exist, in much of the country, without continued federal multiple purpose resource development,” Robinson declared. Then with righteous emphasis, he opened the camouflage valve:

“But of even greater importance is the dependence on federal water resource development of the entire national economy. This is the bigger national interest.”

He went on to cite forecasts by reliable government experts which warn of critical fresh water shortages in the next 15 to 20 years; also estimates from industrial sources that adequate control and conservation of water will require the building of new dams by the thousands.

After a generous play on “national interest,” Robinson shifted gears and zoomed into the real business at hand. He had it all figured out in the simplest terms: “Our need for power will parallel our need for water. . . . Federal power is a competitive regulatory force essential to the protection of the public. And, federal power is indispensable to water resource development.”

From there he launched into an all-out attack on water resource development policies of the Eisenhower Administration, particularly the “juggling” of project cost allocations and payout schedules, which he claimed had destroyed the federal “yardstick” principle.

Certainly there is no dispute about the fact that water supply is a serious headache in many areas, and could become a critical national problem within the next two decades. There is dispute, however, in

Washington and throughout many states, over what is the most practical and effective approach to a solution of the water problem. An area of major disagreement involves the number, size, and types of storage projects needed to meet various regional situations.

As these issues come up in Congress, the public power people are sure to be plugging away as hard as ever for the high dam, maximum power jobs, as opposed to smaller regulating projects in series—regardless of the technical merits.

According to Robinson’s statement, NRECA insists on a “bold” program under “aggressive” federal leadership, which would include: abandonment of present evaluation criteria, especially the “taxes foregone” principle; extension of project repayment period to 100 years; and “reduction of present unreasonably high allocations of project costs to hydroelectric power in order to restore the ‘yardstick’ benefit of federal power.”

Robinson also threw in a strong plug for enactment of “Giant Power” legislation, a gimmick dear to the heart of his boss, Clyde Ellis.

The program we propose, Robinson said, “substitutes the interest of the public for the interest of the fast buck for the privileged few.” Stated another way, they want to pass on more fast bucks to the preferred few in federal power areas, at the taxpayers’ expense.

In a bitter attack on investor-owned utilities, which he charged are “monopolies” under “ineffective regulation,” Robinson apparently got sort of carried away and put his finger right on public power’s real objective: “They ought to be compelled to produce in the public interest or be sacrificed to it. (Produce in what way, or according to whose judgment, he didn’t say.) A vigorous natural resource development program would be a most effective step in the right direction.”



New York Chamber of Commerce Reports on

Public Regulation Of Utility Enterprise

This is a far-reaching contribution by the New York Chamber of Commerce to sound regulatory thinking, and it is hoped that other associations in various parts of the country will endorse the stand taken by the New York Chamber.

The importance of this report is such as to warrant an extensive quote. This is what the Chamber said in its Summary and Conclusions:

"The basic concept of our system whereby public service industries are subject to regulatory control by expert and efficient administrative agencies is a sound one. By and large, the people of the country get good utility service at low cost. Nevertheless, much of the regulatory philosophy now being applied evolved in an economic climate markedly different from that which exists today, or which can be expected to prevail in the future. A former Chairman of the Federal Power Commission had this to say on this point:

'... it is not surprising that the regulatory agencies have tended to carry over, at least initially, principles and procedures developed in older areas of control to enterprises newly added to the regulated group... The emphasis upon rigid restriction of earnings to minimum levels is more understandable when regulation is thought of simply as a substitute for the beneficent action of classical competition in preventing the emergence of monopoly profits.

'While such tendencies may be the natural outgrowth of our evolutionary process, they can become dangerous unless tempered by continuing examination of the economic characteristics and all the surrounding circumstances of the subject business.'

"And Professor Joseph S. Keiper makes these forceful comments:

'... to view the corporation today as the dragon to be slain, or at least kept in irons and fed on a bland diet—as was more understandable in the 18th and 19th centuries—is obsolete, incorrect and childish.

'The nature of monopoly power has changed and we have not sufficiently recognized it in regulation.'

"One of the great strengths of our society and our economy throughout our history lies in the never-ending drive to better all performance, to better the products we create, to better the standard of living, to better our way of life. This philosophy is just as applicable to the practice of regulation as it is to any other facet of our society.

"It is in this spirit that your Committees set forth below certain areas in which we believe that modifications in the practice of regulation will enable it to function more effectively in the future—more effectively in the sense that the impact of regulation will help to produce a better overall result for the good of society. These modifications are not calculated to benefit individual groups, customers, workers, investors, except as such groups are benefited by the gain of the society and the economy, as a whole.

"1. As an economy grows stronger, it can make its decisions with more and more of an eye on long-run considerations and can afford to give less weight to the exigencies of the moment. This is a strong characteristic of our own economy, with which the thinking of regulators has not generally kept pace. Too often, in their judgments, regulators, knowingly or unknowingly, tend to sacrifice long-run benefits for the sake of the short-term ad-

vantage to the consumer of a lower rate level, or other short gain.

"2. It is widely recognized that a steadily increasing proportion of income in this country is available for discretionary or optional spending. At the same time an increasing proportion of utility services are of types which cannot be classed as necessities. Their purchase is at the option of the buyer. Hence, the pricing of utility services is more and more subject to competitive control and, less and less, needs price control as a monopoly product. Regulatory thinking has not kept pace with this change in the nature of our economy.

"3. In situations where regulation undertakes to determine the suitable level of earnings for a utility, the judgment is all too often derived from a consideration of the earnings needed to attract additional capital. It would be more realistic and helpful if this consideration were coupled with recognition of one of the most powerful factors in our economy—the concept that profit plays an affirmative role in contributing to a grade of business performance that is beneficial to the society.

"4. With admitted exceptions, regulation has failed to face up to the impact of permanent changes in the price level on the industries under its supervision. One aspect of this failure manifests itself in refusal to recognize that an investment or rate base built up over a long period of time out of dollars of widely varying size cannot be measured soundly by treating all of those dollars as of equal weight. Another aspect manifests itself through preoccupation with past performance, and past periods in the determination of rates for service, despite the fact that those rates are to be applied in a future period in which investment, cost levels and other factors may very probably be

(Continued on page 51)

Salesmen Are Given the Big "Welcome!"— Here's How Suppliers' Calls Are Aided

Salesmen are welcome at the Pacific Gas and Electric Company.

And the Company thanks them for calling.

PG&E, which serves an area of 94,000 square miles in Northern and Central California, has published a booklet to impress this upon all salesmen involved and to help them in their work by informing them fully about the Company's purchasing policy, procedure and personnel.

This booklet—with the one word title "Welcome"—has been distributed to the 200 salesmen who call regularly on PG&E and to many others who make periodic visits.

Combined they represent firms from which the Company annually purchases approximately \$100,000,000 worth of equipment, materials and supplies.



Frank E. Baxter

An introduction by Frank E. Baxter, manager of purchasing and stores, says:

"You are welcome at PG&E. We hope the presentation of your product or service will be mutually profitable. We recognize that the contribution a salesman can make in keeping us informed on products, services and market conditions is vital to the Company's operations. Accordingly, it is our desire to give all sales visitors an equal opportunity to be interviewed.

"This booklet has been prepared to provide you with a brief introduction to the PG&E's purchasing organization and buying policy in the hope that you will find the information helpful."

The booklet contains chapters on Purchasing Division Responsibility, Organization and Procedures, Relations With Buyers, Contracts, First and Continuing Calls, Bidding, Vendor-Buyer Relations, What We Expect from a Supplier, Vendor

Purchasing Mgr. Frank E. Baxter can't see all salesmen calling on PG&E, but he welcomes many.

Dependability, Product Quality, Operating Cost, plus a list of the personnel and the functions of each.

Information presented on these subjects includes:

OUR RESPONSIBILITY—"The Purchasing Division is responsible for the economic acquisition of equipment, materials and services needed to operate, improve and expand the Company's facilities.

"The Division evaluates new sources, products and manufacturing processes to participate effectively in the Company-wide effort to reduce operating costs."

OUR ORGANIZATION AND PROCEDURES—"The manager is responsible for formulating and implementing purchasing policies and for general supervision of all purchasing functions.

"There are two buying groups—(1) Procurement and (2) Contract Administration.

"The Contract Administration group is functionally responsible for all work and materials contracts, directly processes major construction contracts and buys special materials required to construct major facilities.

"The Procurement Section is functionally responsible for all other materials, including inventory items."

RELATIONS WITH BUYERS—"The Purchasing Division will arrange initial interviews as necessary between suppliers' sales representatives and other departments of the Company. It is recognized that you will have occasional direct contacts with other Company departments, but . . . no purchase commitments are binding on the Company unless appropriately made or authorized by the Purchasing Division."

FIRST AND CONTINUING CALLS—"We want representatives of suppliers to have full and free hearing for their sales presentations. It is to be understood, of course, that our men are not expected to put their time indiscriminately at the disposal of all who may wish it. Follow-up calls on buying personnel are appropriate when a buyer poses a question or when you wish to present information of which you feel the buyer is not aware."

BIDDING—"Bidding is by invitation to a large enough list of suppliers or contractors to assure ourselves of receiving adequate competitive prices.

"Confidential information presented to the buyers or disclosed during interviews, in quotations or other contacts, will be kept in strict confidence."

VENDOR-BUYER RELATIONS—"Buyers and other representatives of the Purchasing Division are required to maintain freedom of action to deal impartially with suppliers, adher-

(Continued on page 51)



It's This "One-Piece" Jaw

That Does the Trick in FARGO Automatic Line Splices



And Here's Why:

Precision machining of the "one-piece" jaw from solid bar stock assures *permanent alignment* of jaw segments, which prevents individual strands of the conductor from getting out of place.

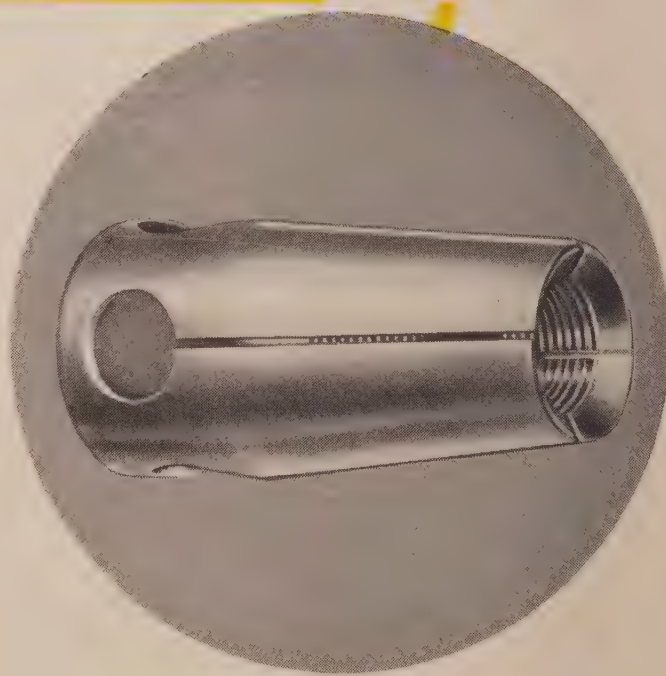
Because of "one-piece" construction, jaw segments flair out slightly as the wire is inserted, to give an excellent initial grip on the wire.

The entire jaw assembly and conductor move forward as a unit when tension is applied to complete the grip—so it can't let go!

The "one-piece" jaw permits a liberal safety zone to be machined into the back of the jaw to accommodate burred ends of the conductor.

For copper conductors the "one piece" jaw is machined from durable silicon bronze . . . for aluminum and aluminum alloy conductors from a high strength aluminum alloy for a strong, permanent, corrosion resistant grip on the conductor.

**Ask your Line Material Field Engineer
for complete details.**



Fargo Automatic Line Splices . . . Reducing Splices . . . Automatic Dead Ends are available in copper and aluminum for copper, Copperweld, aluminum and aluminum alloy conductors for a complete range of sizes.

Distributed by
LINE MATERIAL INDUSTRIES

McGraw-Edison Company
Milwaukee, Wisconsin

In Canada, CLM INDUSTRIES, Toronto 13, Canada



Manufactured by
FARGO MFG. COMPANY, INC.

Poughkeepsie
New York



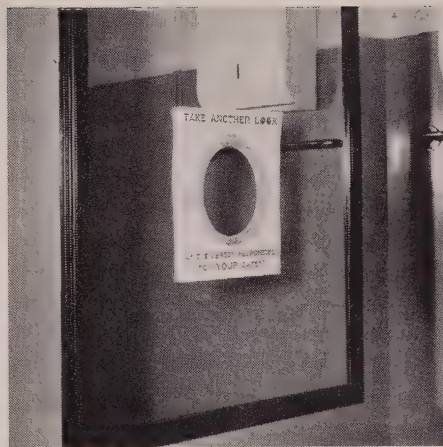
significantly different.

"5. There has not been adequate recognition on the part of the regulators of the obligation to move aggressively to correct such conditions as restrictive or outmoded statutes, failure on the part of legislative bodies to establish clear cut policies, administrative difficulty in prompt processing of cases, and excessive zeal for precision of measurement. Too often regulators take refuge in the plea that such situations are beyond the scope of their responsibilities. Administrative regulatory bodies were established to bring a degree of experience to this problem which the legislatures and the courts could not provide. Who is better qualified by position than the members of regulatory commissions, to promote needed changes in these areas?

"6. One of the major shortcomings of our regulatory system is that it has not found a way to reach decisions with reasonable promptness. In some branches of regulated industry, literally thousands of investors throughout the country today, are unable to appraise the soundness of their investments, not because of uncertainty as to the future, but because, due to excessive delays, they don't even know how much money their companies made or lost during the past four or five years.

"7. In jurisdictions where regulatory commissions have had the assistance of large, able staffs, there is a tendency for the Commission decision to be staff-dominated. Staffs serve a basic need in accumulating data, summarizing facts, and the like. Nevertheless, when the judgment applied to the problem becomes that of the staff rather than the Commission whose responsibility that judgment is, the concept of our regulatory process is not being fulfilled. We urgently need regulatory commissions who are capable and willing to make their own judgments.

"8. There are a number of unresolved questions about the organization and assignment of responsibilities of regulatory agencies. These are technical questions on which your Committees have taken no stand. The Committees do deplore, however, the fact that the



The unusual safety poster shown above, mounted on the mirrors in all Commonwealth Edison system washrooms, reminds employees to "Take Another Look At the Person Responsible For Your Safety." The poster ties in with the theme of the company's whole safety program, depicted clearly in a motion picture, "Take Another Look," filmed on the company's properties and using employees as actors. (EL&P, June 15, 1960, p. 3)

same staff group which may organize and present a case against a utility's request will also advise the Commission in its decision and assist in writing the opinion.

"9. Your Committees of course recognize that all public business—including that of the regulatory agencies—must be conducted in accordance with the highest standards of ethical conduct. We regret that apparent lapses in this respect at times may have tended to weaken public confidence in the integrity of the regulatory process. But we would deplore the enactment of drastic legislation which would unduly 'judicialize' the commissions or preclude proper informal contacts between the regulators and the regulated, which can contribute greatly to the understanding by each of the problems of the other, to the avoidance of unnecessary delays, and thus to the public interest in wise and effective regulation. The cure for such indiscretions as may occasionally have occurred would appear to lie rather in the character and selection of those named to positions of public responsibility than in the area of legislation, which could entail unintended but harmful by-products. For, as a great public servant has remarked: 'Good men can produce better results with a poor law than poor men can produce with a good law.'"

ing to the policy of equal consideration to all qualified suppliers and basing their dealings and negotiations on ethical purchasing standards. Our buyers are free to inspect vendors' plants or facilities if, in their opinion, such visits are mutually beneficial."

EXPECTED FROM A SUPPLIER—"PG&E consumes large quantities of supplies as it participates dynamically in the growth of Northern and Central California. Suppliers are most effective in helping us discharge our responsibility when they appreciate the following specific problems which are considered in selecting bidders and in awarding contracts and purchases."

VENDOR DEPENDABILITY—"We rely on each of our regular vendors to honor requested delivery dates. Prompt delivery on agreed dates enables us to lower our operating costs by keeping our inventory at a minimum level. In addition, we wish to avoid asking customers to wait for service because of materials shortage."

PRODUCT QUALITY—"Our appraisal of your product will be in terms of providing the best gas, electric, water and steam service at the lowest possible cost. The Company maintains a Bureau of Tests and Inspection which helps us to determine whether a proposed product is appropriate to our needs. Your product may be tested for acceptance if it holds definite promise of savings."

OPERATING COSTS—"We are actively interested in any proposal you may have that will enable us to provide utility service faster, better and particularly at lower cost. Our interest includes suggestions for substituting materials or modifying our purchasing practice to reduce your cost in supplying our requirements. PG&E's interest in reducing operating costs recognizes that we face competition. Our rates must be low enough to meet competing sources of energy that are available to certain customers and to demonstrate that private ownership is the most effective form of business organization."



6000

Mr. R. N. McCollom, Power Transformer Department Manager, announces plans to build this power plant at the newest

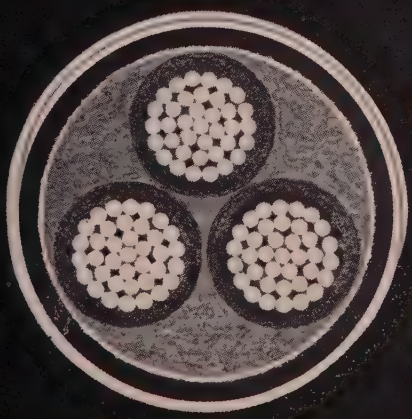
Westinghouse transformer facility in Munster,



GENERAL CABLE INTERLOCKED ARMORED CABLE

For full protection under all conditions install General Cable Interlocked Armor...the cable for power, control, communication and lighting systems. This compact, versatile cable is available in a wide range of constructions, insulations, armors and voltage ratings. Colored polyvinyl chloride jacket over the armor can be furnished where required. "How to Obtain the Greatest Advantage Per \$ Spent" a comprehensive folder detailing General Cable's complete line of Interlocked Armored Cables is

available upon request. General Cable Corporation, 730 Third Avenue, New York 17, New York. Offices and Distributing Centers Coast-to-Coast. ☎



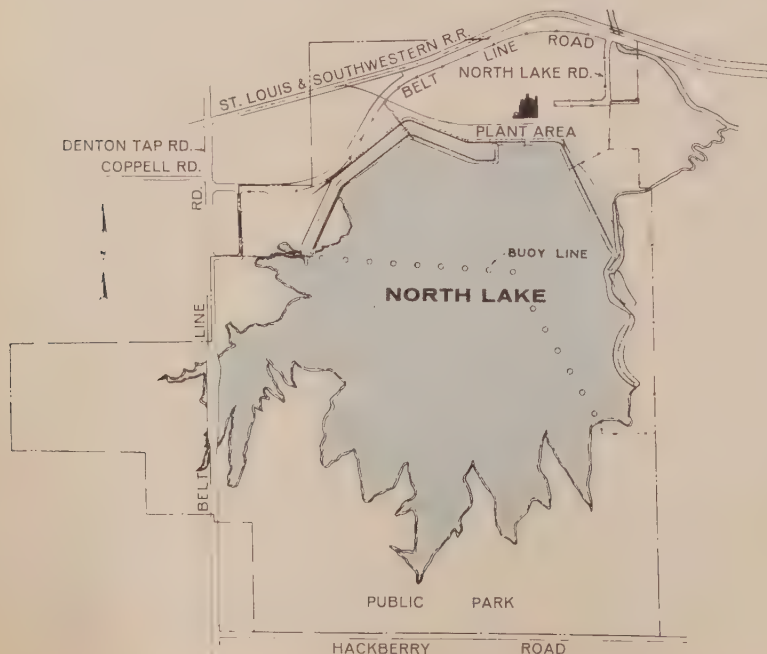
PLANT DEDICATION ADDS NEW DIMENSION TO UTILITY-COMMUNITY RELATIONS



Formal dedication of DP&L's North Lake generating station and presentation of large lake-side recreation area to City of Dallas attracts large group of public officials and civic leaders.

Planning with community welfare in mind enables utility to present service area with vast new recreational facilities.

General arrangement of DP&L property showing location of generating station, area covered by North Lake, and area presented to city for a park.



FORMAL DEDICATION on May 27 of Dallas Power and Light Company's new North Lake generating station, about 14 miles northwest of downtown Dallas, is worthy of more than passing interest because it demonstrates that today's electric utility is considerably more than a manufacturer and distributor of electricity. Through a broader concept in planning it has become not only a good neighbor but a vital force in its community, contributing immeasurably to the development, growth, and prosperity of its service area and to the well being of its customers and employees.

When DP&L built its 175-mw North Lake station (work is well underway on a duplicate unit), it was necessary to create an 800-acre man-made lake to provide cooling water. This, of course, required a considerably larger tract of land, not only for plant location but also for controlling the perimeter of the

lake. Of the 1960 acres in the entire tract, the company was able to turn over to the City of Dallas about 530 acres of the lake itself and about 640 acres of land for a park and recreational area. Thus, in a single project the company has combined facilities to help meet Dallas' future needs for industrial, commercial, and residential power and for extensive recreational facilities as well.

Dedication Ceremonies

Double purpose of the formal ceremonies, dedicating the new plant and presenting Dallasites with a new park, earned the acclaim of top public officials and civic leaders who made up an impressive portion of the 400 persons attending. In addition to company officials and members of the Dallas Electric Club, guests and speakers included distinguished representatives from the city and county governments and from business, educational and other circles.

Members of the press were present too, and editorials appearing in local papers were forceful in their praise of "farsighted business concerns who are making possible a better, more livable city."

One editorial said "... Here is free enterprise under the capitalistic system moving as no socialistic government and certainly as no industrial development under socialism will or can move in the public interest."

The Lake and Park

Of the 800-acre area of North Lake, approximately 530 acres will be available for swimming, fishing, boating and other aquatic sports. The lake has already been stocked by the City of Dallas with bream, bass, and crappie. Boathouses, docks, and launching ramps are planned.

Development of the 640-acre land area adjacent to the lake for use by the public is well under way. Cooking pits, picnic tables and trash receptacles have been placed there by the city and a meandering road through the property has been built by the County of Dallas. In addition, a great many trees have been set out as a cooperative project of the city and the Camp Fire Girls.



The 175-mw North Lake Station is outdoor type with gas-fired boiler producing steam at 1800 lb and 1000F. A duplicate unit is well along in construction.

C. A. Tatum, Jr., left, president and general manager of DP&L, shows Dallas Park Board President R. E. Hubbard the boundary lines of recreation area turned over to the city by the utility.



Sketch plan of recreational facilities at North Lake Park under development by the City of Dallas for picknicking, boating, and fishing.



Novel promotion employing electric blankets as incentive bonus sells over 4400 dryers in two months.

By Howard R. Gravatt
Coordinator of Dealer Promotions
Long Island Lighting Company



UTILITY TEAMS UP WITH TEXTILE FIRM TO BOOST POWER USE

TO INCREASE power consumption potential during low-load hours, as well as to boost the sale of electric and gas home appliances in its area, the Long Island Lighting Company teamed up last fall with Indian Head Mills, textile manufacturers, in a novel promotion.

We selected the Nashua automatic electric blanket, a product of the Slumberest Company, with a retail value of \$19.95 as an incentive bonus to its customers for the purchase of an electric or gas dryer.

Huge Success

The promotion was a huge success. The dealers liked it because it got the customers into the appliance stores, and the customers liked it because they got a valuable gift.

Just how successful the promotion was can be judged from the final figures. During the two-month period of the campaign, 4443 electric blankets were ordered, which meant that 3003 electric and 1440 gas home dryers had been sold. This was 110 dryers more than had been sold in the previous year's campaign which ran 20 days longer.

Three Promotions

The Long Island Lighting Company serves more than 566,000 con-

sumers. It conducts three promotions a year to help manufacturers increase sales of appliances, particularly in the low-saturation fields.

Generally, its Fall campaigns have been built around home dryers because it has found that dryers are more acceptable to the consumer at that time of year. In 1958, the utility offered its customers \$10 toward the purchase of a dryer if they would bring in a piece of clothesline.

One Blanket Size

To simplify matters, one blanket size was selected—72 x 84 in.—which would fit either a single or double bed. Customers had a choice of two colors, blue or pink. Each blanket had an unconditional, 2-year replacement guarantee from the manufacturer. Cost of the premium was shared by the utility and the appliance manufacturers. The utility was billed direct for the blankets by the mill.

An intensive campaign was waged by Long Island Lighting to promote the premium. It placed a total of 35,000 lines of daily and weekly newspaper advertising supplemented by 500 radio spots throughout all of Long Island. In addition, the utility made available

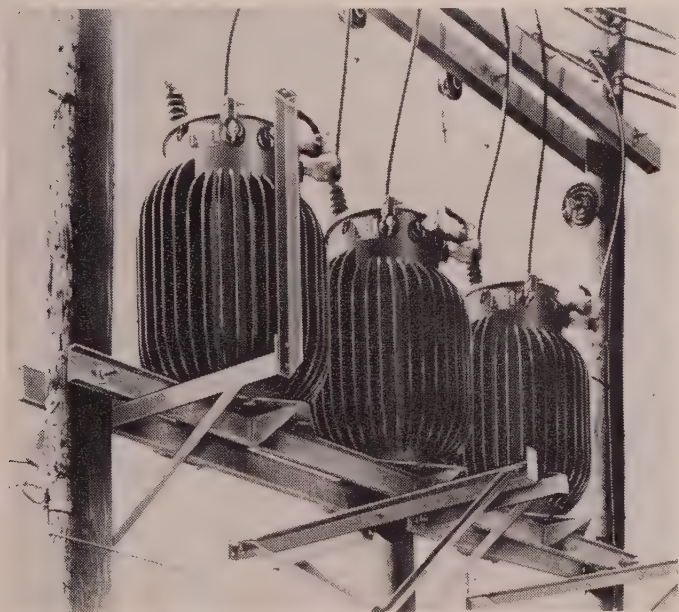
a limited amount of cooperative advertising funds. One-third of cooperative advertising cost was paid by the utility.

Promotional Material

Enclosures, titled "A Reminder from Lil," were mailed with 120,000 electric and gas bills, telling customers of the blanket gift offer and listing the names of the 16 makes of dryers available. Point-of-sale display material and colorful streamers were distributed to dealers, and dealer salesmen received kits containing sample advertising layouts, a news letter giving details of the promotion and other information. An electric traveling sign atop the Long Island Lighting Company's office in Hempstead served as a constant reminder to the residents of the premium offer.

We had originally approached Indian Head Mills, distributors of the Nashua blanket, with the idea of using the Pequot Easy-Care No-Iron sheet, as a premium. We had been impressed with the success of no-iron sheet premiums in various promotions of home laundry appliance manufacturers. However, we realized that the offer of the blanket would not only help stimulate sales but also increase consumer use of
(Continued on page 99)

More KVA In Same Space



Avoiding the necessity of securing additional space to build a ground-type substation to furnish the increased capacity required by its customers, Houston Lighting and Power replaced three 100-kva units with three 333-kva 7.2-kv distribution transformers supplied by Westinghouse Electric Corp. The units were placed on the existing 14-ft rack in the alley behind the customer's plant. The rack was not modified in any way, because each 333-kva unit is about 35 in. in diam. and 57 in. high. In addition, each unit weighs less than 2000 lb—about the weight of the 167-kva distribution transformers of five or six years ago.

Stainless Steel Attacks Cavitation Ravages

The Hydro Electric Power Commission of Ontario diminishes the ravages of cavitation by depositing a thin layer of stainless steel on the affected areas of the blades. According to R. R. MacDonald, manager, electric products, central district office, Linde Co., Ontario, Canada, Mig (inert-gas consumable-electrode) welding was selected as the fastest, most economical way to deposit stainless steel coatings of superior quality. Argon shielding protects the weld area from contamination, while the consumable electrode deposits a hard, dense stainless steel surface.

Using a portable Sigma SWM-2 welding machine from Linde Co. Div. of Union Carbide Corp., Ontario Hydro performs all welding within the power house. In some instances the welding is done without removing the turbine blades (overhead welding techniques are employed to eliminate dismantling of the turbines).

Cavities are first "filled" with Oxweld No. 66 (carbon steel) wire, 1/16-in. diameter, and surface clad-

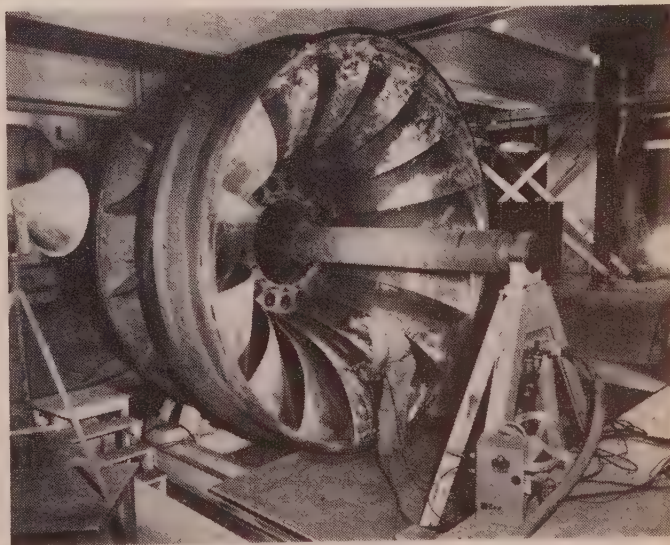
ding is then completed using type 301 stainless steel wire. Bronze turbine runner blades are also rebuilt, using Oxweld No. 26 wire (Everdur alloy). "Life of these turbine blades has been doubled, with no evidence to date of any major re-cavitation," Mr. MacDonald said.

Neoprene Racks Up Good Score As Protector

Nine Years' immersion in water-filled ducts at Philadelphia Electric's Holmesburg substation had no deteriorating effect on three 69-kv neoprene-jacketed lead-covered 2.7-in. OD cables. When resistance tests were run, sheath-to-ground resistance on each cable was in excess of ten megohms per sq ft.

The underground ducts could have been graded to prevent collection of water, but this would have been an expensive and time-consuming operation. Instead, Du Pont neoprene jackets were used. The extra cost of the jackets, engineers figured, would be more than offset by the greater reliability of the cables. And, of course, there would also be an actual cost savings realized in the simpler duct construction.

Meanwhile, after several successful trial applications, starting December, 1955, Georgia Power now uses GACO N-700-A (Gates Engineering Co.) neoprene maintenance coating to weatherproof outdoor insulated surfaces at its power plants. Areas coated include dust collectors, induced draft ductwork, induced draft fans, tanks, vent pipes and piping and tubing.



Cavitation affect is combatted with welded stainless steel on blade surfaces.



138-KV

SUBSTATION REDESIGN BRINGS INSTALLATION \$ DOWN

Substation designers effect economies on structures, buses, foundations and related items; through engineering-economic study.

AN engineering and economic study reveals that savings as high as 50 percent of the installed cost of structure, bus, insulators and foundations can be expected for 138-kv substations.

Commonwealth Edison's continually increasing system load requires installation or expansion of an appreciable number of 138-kv substations to supply local area loads. Since most of these are in the planning stage, there has been enough time to critically examine present practices in an effort to reduce future investment costs to a minimum.

In the past, structures have generally been individually designed by vendors to meet a functional specification for each location. With the large number of installations being planned, it seemed obvious that economies could be made by repetitive use of standard components and structures. The problem is proper selection of standard components so they will be applicable without modification for the majority of installations.

To establish the range of application, and determine common requirements, diagrams of typical electrical arrangements were studied (See Fig. 1). It was readily apparent that no single fixed arrange-

ment of equipment and structures could meet these requirements.

The most important requirement of any concept was flexibility of components and over-all design to allow freedom of arrangement to:

1. Permit the use of any bus arrangement.
2. Allow for future expansion with minimum rearrangement and cutover.
3. Allow for addition of special equipment when required.
4. Require installation only of equipment and structures needed for any one step in the development.
5. Permit continued in-place use of equipment installed in previous steps of the development.

Some of the design parameters of this study were conclusions established by previous studies. These were:

1. Based on C.E.Co. requirements and construction methods, a rigid bus is more economical than a strain bus.
2. The substation can be more economically furnished as a substation "package" by a vendor than by using company engineering and pur-

By **PAUL M. BLACK**
Specifications Engineer
Distribution Engineering Dept.,
Commonwealth Edison Company

and

JACK C. FOSS
Section Engineer
Station Electrical Engineering Dept.,
Commonwealth Edison Company

chasing individual items of equipment.

3. Double or transfer buses are not required at most substations. However, any structure should be flexible enough so these features can be added when required.
4. Lower total costs can be obtained by using a basic transformer size and installing additional units for load growth rather than changing the transformer size. This furthers a "building block" concept of development.

Additional design parameters, which differed from previous practices, were developed for this study. Space for operating and maintenance is provided by truck aisles to all breakers and transformers. Additional aisle space, where required, is allowed for removal of any transformer or breaker without outage of other equipment. However, free movement of vehicles throughout the substation area is not required. Therefore, space for vehicle movement is provided only between truck aisles and access area.

Thirty-three-ft minimum clearance is provided over all vehicle aisles, which permits clearance for safe movement of a truck with boom in working position.

At other locations, minimum clearance above ground level to energized buses or equipment terminals was established as 16 ft. Present spacing between rigid bus conductors was reviewed and reduced to 8 ft center-to-center.

After requirements and design parameters were established, an examination was made of functions of equipment now being installed. This showed that in practically all cases, any one piece of equipment was performing only one function. For instance, the insulator of a disconnect switch was being used only for that purpose; separate insulators were being installed as bus supports. It was obvious that a saving could be made by doubling-up functions wherever possible.

"Function-doubling" emphasized the need for flexibility of components and proper location and spacing of devices and/or equipment in relation to each other. For instance, the disconnect switch insulator can

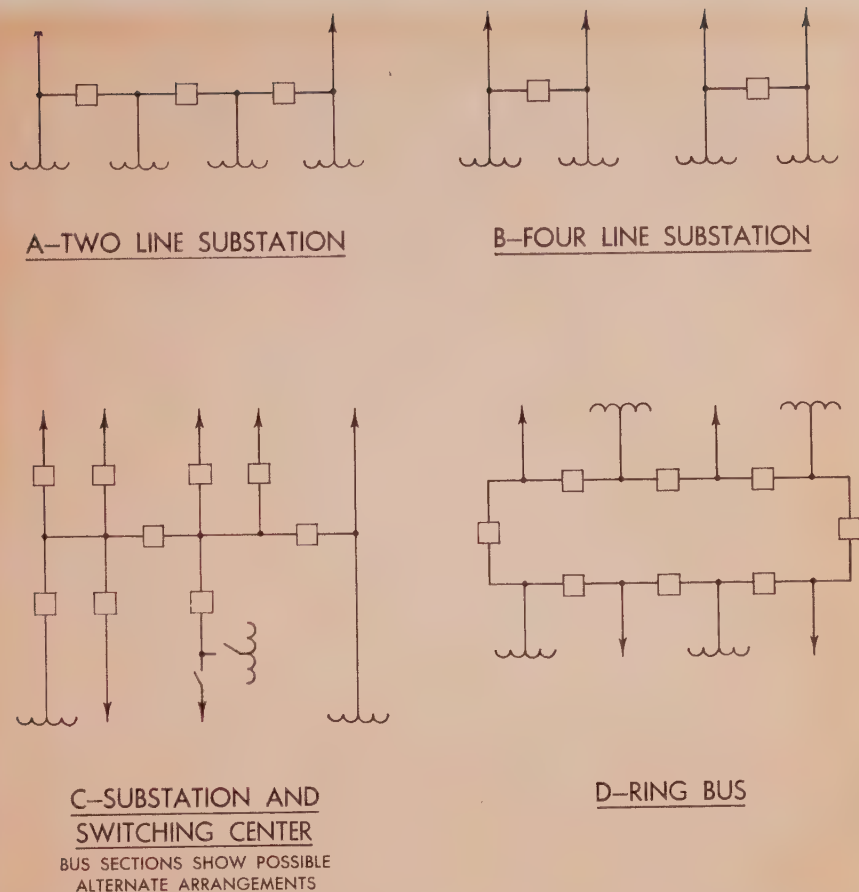


Fig. 1—Wide range of applications which must be satisfied on Commonwealth Edison's 138-kv substations include: A—Two-line substation; B—Four-line substation; C—Substation and switching center (Bus sections show possible alternate arrangements).

Fig. 4—In the unit concept each piece of equipment does its job, and its job alone.

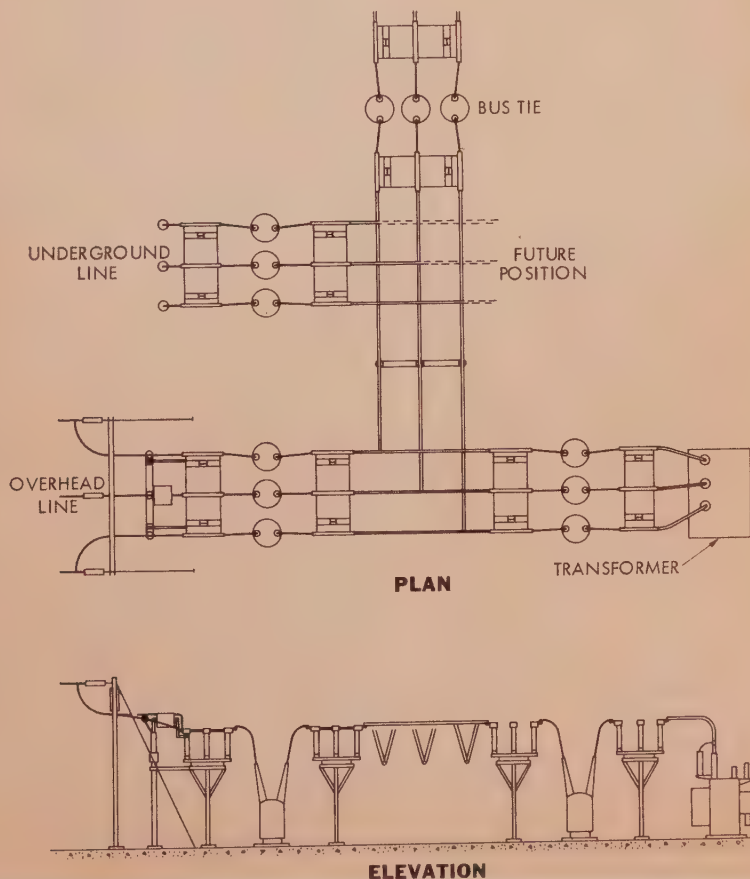


TABLE I

Economic Comparison of
Disconnect Switch Stands

Item	4 Leg	2 Leg
Steel Weight	1800 Lb	2050 Lb
Steel Cost	\$ 540	\$ 615
Erection Cost	180	200
Footing Cost	780	560
Total Cost	\$1500	\$1375

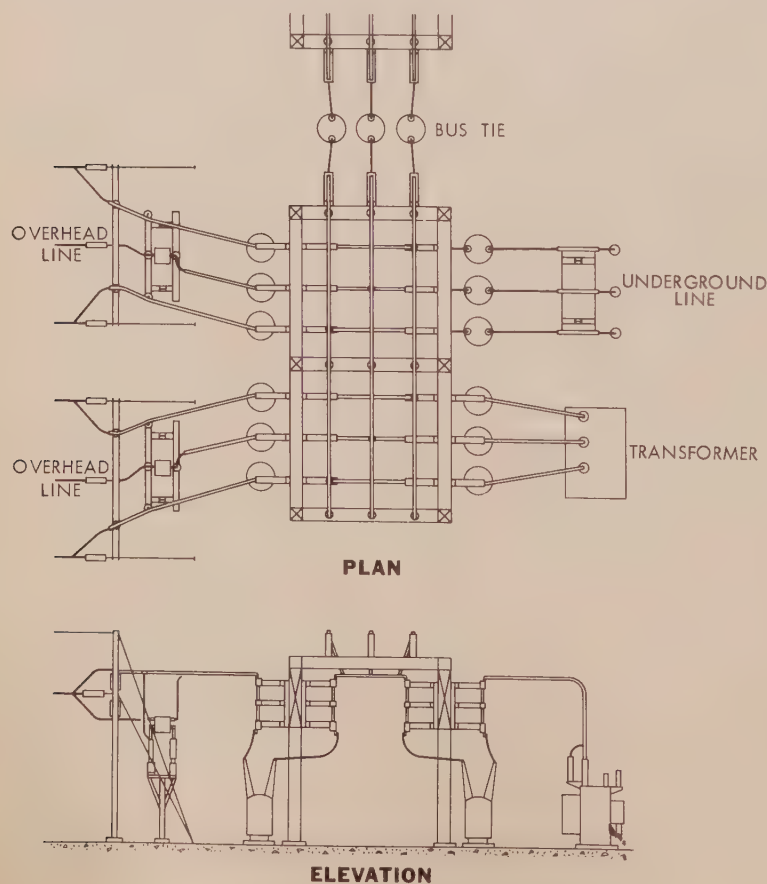
TABLE II

Economic Comparison
of
2 Line, 4 Tr., 138-kv TSS*

Design	Step 1	Step 2	Step 3	Step 4	Total
Unit	\$ 6,630	\$10,860	\$ 7,300	\$ 7,300	\$32,090
Bay	10,260	13,700	10,110	9,470	43,540
Present	21,020	17,880	15,200	15,030	69,130

Step 1—1 Line, 1 Tr.
 Step 2—2 Line, 2 Tr., 1 BT
 Step 3—2 Line, 3 Tr., 2 BT
 Step 4—2 Line, 4 Tr., 3 BT
 * Fig. 1A

Fig. 3—Separate disconnect switch stand and guyed solid-member steel structure team up for most economical dead-end-to-station connection.



be located in relation to the bus so that the span for connecting disconnect and bus can be self-supporting and not require an intermediate support.

Extension of this functional examination to the structure, revealed that in previous designs the line take-off requirements—rather than equipment in the structure—frequently determined structure size, strength, and foundations.

It was, therefore, decided that line termination requirements would be separated from substation requirements and resolved as a separate problem after design and equipment arrangement had been established on a functional basis.

When all factors were considered, the concept which most adequately met all conditions was the use of individual structures for each unit of equipment. Thus, each piece of equipment can be located to fit any desired arrangement without requiring present investment for future requirements. The individual structure concept reduces interrelation between units to a minimum and provides sufficient flexibility to obtain maximum functional use of each unit.

Another advantage offered by individual structures is their substantially reduced steel requirement. They are designed to carry only individual equipment loading.

Individual structures and equipment components were developed on an economic basis. For instance, disconnect switch stands. Installed costs were evaluated for single-two-and-four column supports (See Table I). It was found that the four-column stand has the lowest weight of steel, hence, the lowest purchase price, but it has higher foundation costs than a two-column stand.

An economic comparison using today's dollars shows that the two-column stand has the lowest installed cost. Therefore, this design was adopted as a standard disconnect switch stand.

Similar comparisons were made for bus supports, potential device stands, etc., to determine the lowest installed cost design for each individual structure. No attempt was made to detail individual pieces of steel. It will be the responsibility of the supplier to furnish equipment structures within the design cri-

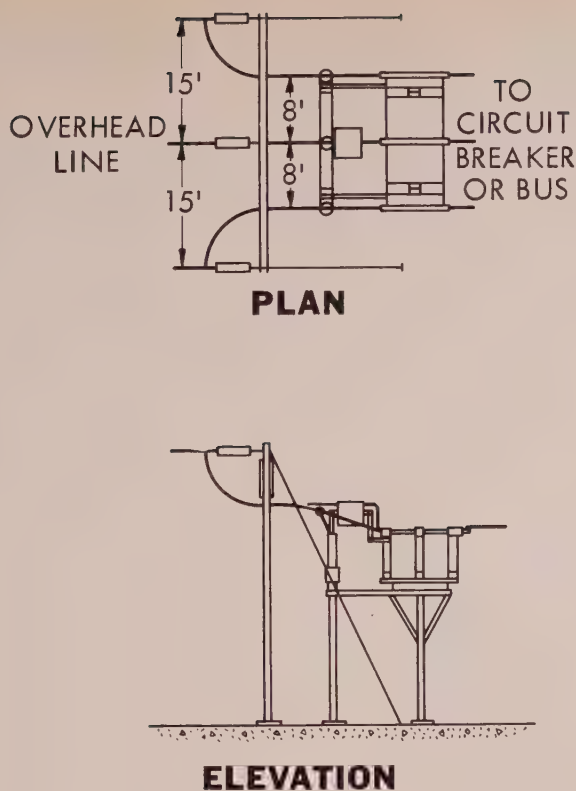


Fig. 5—When available space limits unit-type design, a standard, reduced-bay design is used.

teria set as a result of this study.

Concurrent with design development of the structures, an attempt was made to develop standard foundations. Because of wide variations in soil conditions, our structural designers determined it was more economical to design for each location rather than develop a standard foundation suitable for all soil conditions. However, further investigations are being made of possible ways to reduce foundation costs. For the purposes of the study, an average soil condition was assumed

and foundation costs were estimated on that basis.

One of the economic benefits resulting from structure design is the reduction in number of flexible connectors used for equipment bushings. Bare cable, with or without wire guides, is used for most bushing connections instead of rigid bus and flexible connectors (See Fig. 2).

Another savings made possible by minimum spacings is the use of self-supporting bus spans. Main bus spans are supported on equipment

insulators. Cross buses are supported on an equipment insulator at one end and by an "A" frame bus-to-bus connection at the out-board end, which eliminates all bus supports. This arrangement also reduces use of bus supports for the main bus to a minimum.

After the substation equipment design had been established, the line termination problem had to be resolved. The unit structures for equipment did not allow either strength or spacing for termination of an incoming line. Logical corollary of a unit concept was to provide a separate structure functionally designed to meet mechanical requirements of the line terminations and serve as a transition to substation equipment structures.

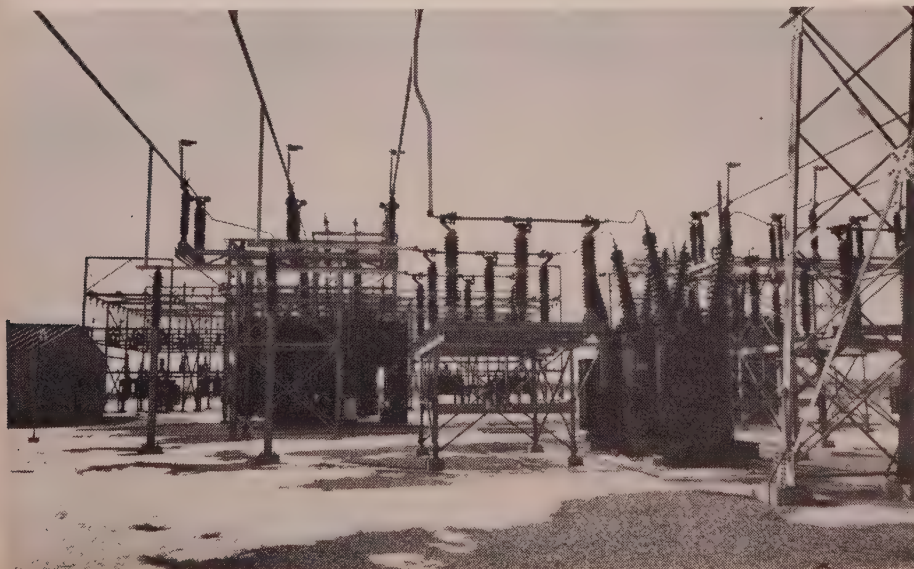
The Transmission Engineering Department cooperated in determining the following termination design limitations: 1) 2500 lb wire pull per line conductor, 2) 1500 lb per static wire, 3) a span length not to exceed 150 ft, and 4) a pull-off angle not to exceed 30 degrees. These were determined as applicable to any installation. To permit transition from flat close spacing at the substation structure to vertical spacing at the first transmission tower, it was established that conductors should dead-end in a horizontal plane on 15-ft centers, and that the minimum 33-ft clearance above ground was satisfactory. Use of this separate dead-end structure requires coordination with Transmission Engineering to locate the last transmission tower so that these limitations are not exceeded.

Several possible designs were considered. Three of these designs were developed in detail for an economic comparison. Any of these was more economical than a line dead-ended on the main structure. The most economical design was adopted, a combination of separate disconnect switch stand and guyed solid-member steel structure (See Fig. 3).

After individual-structure design was established, the structures were used as assemblies to satisfy electrical arrangements and design parameters. It was found that various combinations and arrangements of the individual structures could satisfy any of the required electrical connections. Thus, the unit-type

(Continued on page 100)

Fig. 2—Substation evaluation has already begun. Note flexible cable connected to breaker bushings. Spacing has been reduced to 8 ft here.



FEEDER VOLTAGE CALCULATIONS

Chart simplifies determination of voltage and load at any point on a feeder for convenience in solving voltage and loading problems or applying capacitors.

By R. A. DEWBERRY, Distribution Engineer, Montana-Dakota Utilities Company

IN WORKING with voltage problems, feeder loading, capacitor applications, etc., it is frequently necessary to know the voltage or load at a specified point on the feeder. The usual voltage chart is designed for express feeders and therefore does not take into account the decreasing load as we proceed from the station. Hence, it becomes necessary to resort to approximations or actual measurements to determine loading and voltage at specified points on the system.

In practice these approximations are generally accurate enough for most problems but since the load varies inversely as the distance from the station on a uniformly loaded feeder it is possible to determine and plot the load or voltage drop as a function of the distance from the station. Once this is done for various conductors, as shown on the chart, it is a simple matter to get the percent drop with fair accuracy at any point on the feeder.

Assume a uniformly loaded feeder and let the total feeder length be 1. Then the kva at any point will be

$$(1) \text{ kva}_x = \text{kva} (1 - x)$$

where kva_x = kva at any point x .

kva = total feeder kva

x = per unit distance from station.

The voltage drop for any element dx will be

$$\Delta E = \text{kva} (1 - x) Z dx$$

where Z = total impedance per phase.

$Z dx$ = impedance per element.

Then the percent drop for any element will be $\frac{\text{kva} (1 - x) Z dx}{10 \text{ kv}^2}$,

and the total drop at any point x is
(2) percent drop =

$$\int_0^x \frac{\text{kva} (1 - x) Z dx}{10 \text{ kv}^2} = \frac{\text{kva} (x - x^2/2) Z}{10 \text{ kv}^2}$$

The impedance per 1000 feet is plotted as a function of wire size, spacing, and power factor as shown in the upper left of the chart. This is plotted on a vertically logarithmic scale and any point on these curves projected to the right on the feeder-length curve will give the product $zI = Z$.

The other factor of equation (2), $\frac{\text{kva} (x - x^2/2)}{10 \text{ kv}^2}$, is plotted as a function of kva, kv, and per unit distance x as shown in the curves in the lower left of the chart. Any point on these curves projected to the right to intersect the Z value and then followed along the diagonal to the base line will multiply the factors Z and $\frac{\text{kva} (x - x^2/2)}{10 \text{ kv}^2}$ and thus give the percent drop.

Example

Working an example will best illustrate the use of the chart. Assume a uniformly loaded 4.16-kv feeder of four 1/0 ACSR conductors, five miles long, 60-in. equivalent delta spacing, carrying a total load of 400 kva at a power factor of .9. Determine the percent drop and the kva load at 3.0 miles from the station.

P. U. Distance $x = 3/5 = .6$

Enter the chart simultaneously at P. U. distance .6 and power factor

.9; extend vertically upward from the P. U. distance scale to the 400 kva load curve; extend vertically downward from the power factor scale to the 1/0 ACSR, 60-in. spacing conductor curve. Then, from the point on the conductor curve extend horizontally to the right to intersect the five-mile curve. At this point drop a vertical to intersect the horizontal projection of the point previously obtained on the kva load curve. The point thus determined extended along the diagonal will intersect the percent drop scale at 5.49 percent, representing a 5.49 percent drop for conditions assumed.

From equation (1), kva at 3.00 miles from the station is $400 (1 - .6) = 160$ kva. The voltage at any other point on the feeder may be obtained by starting with the P. U. distance corresponding to the point in question and following the procedure outlined.

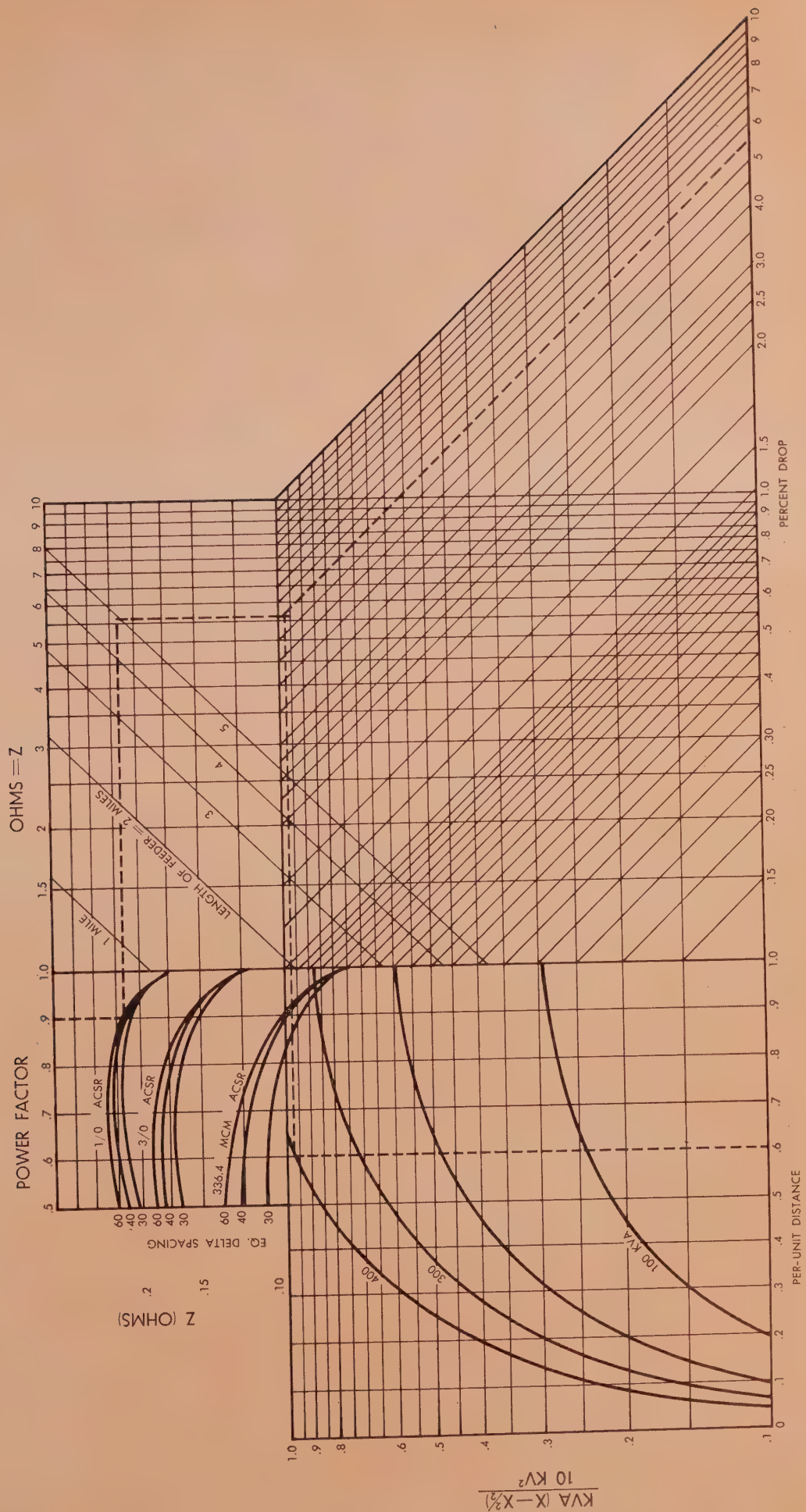
The chart is based on 4160 volts, three phase. For voltages and loads beyond the chart capacity the drop is given by:

$$(3) \text{ percent drop} = \frac{\text{percent drop}_a \times \text{kva} \times 4.16^2}{\text{kva}_a \text{ kv}^2}$$

where percent drop_a = percent drop obtained by using an arbitrary load, kva_a
kva = actual load kva
kv = actual kv

For example, if all conditions in the foregoing example were the same except $\text{kva} = 1000$ and $\text{kv} = 12.5$, the percent drop would then be:

$$\begin{aligned} \text{percent drop} &= \frac{5.49 \times 1000 \times 4.16^2}{400 \times 12.5^2} = 1.520 \\ \text{kva at 3.0 miles} &= 1000 (1 - .6) = 400 \end{aligned}$$



GRAPH SIMPLIFIES DETERMINATION OF ECONOMIC CONDUCTOR SIZE

A graph with non-linear scale enables preparation of a chart for determining economic conductor size for transmission and distribution lines with a minimum of computational and plotting effort.

By M. G. REKOFF, JR. Assistant Professor of Electrical Engineering, The A & M College of Texas

AT SOME POINT in the selection of economic conductor for a distribution or transmission line one must display the relationship between the cost of owning and operating the line as a function of the load the line is expected to carry.

The term "cost" here implies the annual cost of total or per-unit length of line and the term "load" implies peak kw or peak amperes or whatever is convenient. The most common forms for displaying this data is to graph either Cost per Unit Load vs. Load¹ or to graph Cost vs. Load. The latter form is most convenient for simplification and is shown in Fig. 1 where both the ordinate and abscissa are calibrated with linear scales.

The expression for Cost is given by

$$\text{Cost} = g_1 + g_2 (\text{Load})^2$$

where g_1 represents the fixed cost and g_2 represents the coefficient of variable costs consistent with the dimensions of Load squared.

Since all the curves of Fig. 1 are

parabolas and each curve requires that a significant number of points be calculated, one is justified in seeking a different, more easily determined form for presenting this data. If one constructs a graph where the abscissa is calibrated with a parabolic scale and the ordinate with a linear scale then the data represented in Fig. 1 appears as shown in Fig. 2. Using this newly-constructed graph paper, any one curve can be completely established by calculating just two points and connecting them with a straight line.

A graph of the form shown in Fig. 2 can be used for any range of load variable since the scale of the load coordinate can be multiplied by any suitable constant as illustrated in the following example*:

Suppose it has been determined that the annual costs of conductors to be used in a specific line are given by the following expressions:

795 mcm

$$\text{Cost} = \$164,000 + \$8.5(\text{mw})^2$$

1431 mcm

$$\text{Cost} = \$170,000 + \$5.2(\text{mw})^2$$

2040 mcm

$$\text{Cost} = \$240,000 + \$4.1(\text{mw})^2$$

One first chooses a convenient scale, say 300 mw, for the maximum load to be considered. Also, let each scale division on the Cost scale represent \$20,000 starting with \$100,000. Computing the cost for each conductor at a convenient load point, say 200 mw, one obtains the following:

795 mcm	\$504,000
1431 mcm	\$378,000
2040 mcm	\$404,000

By plotting this data for the 795-mcm conductor (at zero load Cost = \$164,000 and at 200 mw load Cost = \$504,000) and connecting the two points with a straight line the cost data for all loads less than 300 mw is completely specified. Plotting the points and completing the graph for the remaining conductor sizes yields Fig. 2. The intersection of the curves of the 1431-mcm and the 2040-mcm conductors occurs at 0.85 which corresponds to a Load of (.85) (300) = 254 mw.

Reference—

1. Economic Conductor Size For Transmission Lines, H. F. Small, Electric Light & Power, June 1, 1960, pp. 58-61.

*Reconstructed from data of Fig. 1 of Reference 1.

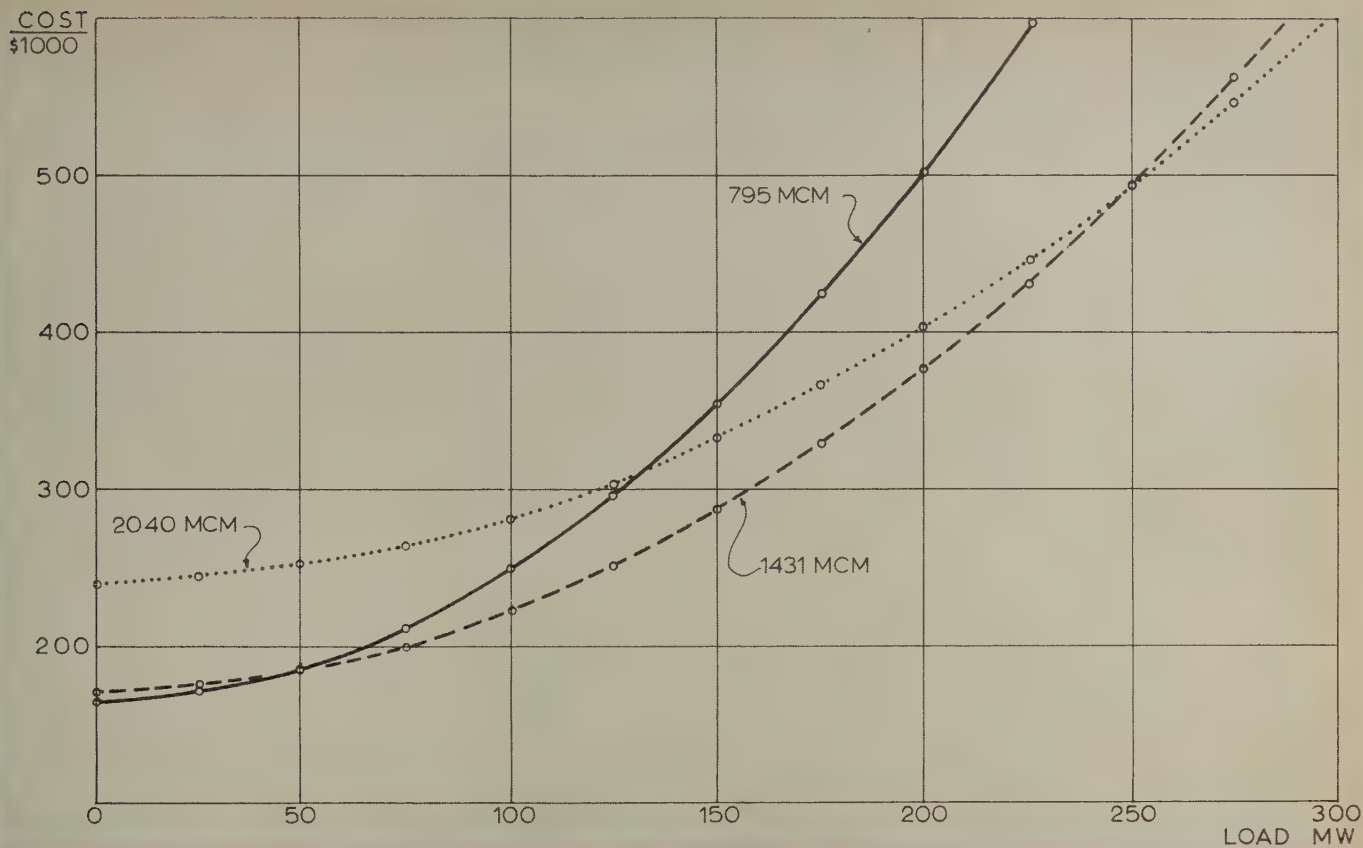
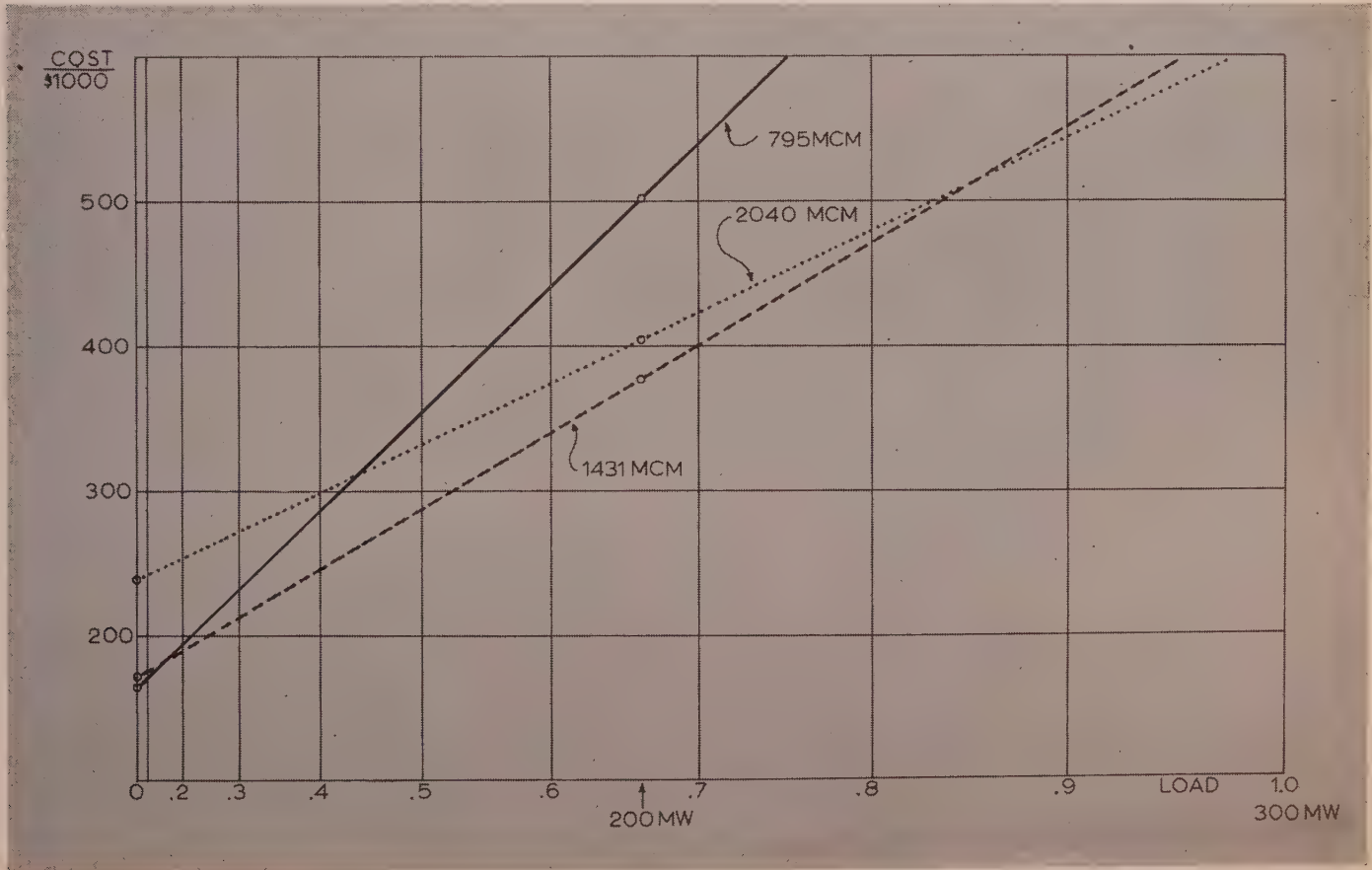


Fig. 1—Customary form of graph for determining economic conductor size, using linear scales for ordinate and abscissa.

Fig. 2—Reconstruction of Fig. 1 graph using parabolic scale for abscissa. This technique permits establishing any one curve by calculating just two points and connecting them with a straight line.



REMOTE OUTAGE LOCATORS

AFTER THREE YEARS

If the apparent need for unattended radio transmitters for reporting system outages is to be successfully fulfilled, equipment and operating rules will need some changes.

By JOHN C. SLOTHOWER Past Chairman, National Committee for Utilities Radio

A GREAT flurry of interest arose a few years ago when the Federal Communications Commission first permitted utilities to use remotely placed "outage locators" on mobile radio frequencies. While this interest has waned somewhat because of equipment limitations and restrictive FCC rulings, there appears to be a very definite need for these devices.

The "outage locators" referred to are the remote unattended transmitters operating on the mobile frequencies for the specific purpose of reporting "failures" in electric, gas, water or steam transmission or distribution systems. Typical installations of such devices are shown in Figs. 1, 2 and 3.

These devices are normally actuated either by a mechanical linkage or electrical circuit connected to a switch or recloser. See Fig. 4.

Sends Coded Pulses

Should the monitored equipment operate, the locator will transmit coded pulses via mobile radio frequency. The pulses are received at a central point and recorded. Their number and grouping identify the location of the equipment operation.

Predictions were made by both the manufacturers of these devices and by those who planned to use them that they would "revolutionize" the operation of electric and

gas distribution systems at least insofar as obtaining information as to outages was concerned.

A survey made by the Engineering Subcommittee of the National Committee for Utilities Radio of eleven utilities which have made use of the "outage locators" shows their needs as well as their limitations. See Table I.

Idea Is Sound

Opinions of those actually using "outage locators" seem to be nearly unanimous that the idea of this type of equipment is not only sound, but that it is badly needed and could and should perform a valuable function. One company stated that the locators reduced outage time by an average of 40 minutes. Another "materially reduced length of customer outages."

Companies surveyed agreed that although the installations may be relatively costly, the use of the locators may still be justified in rural areas where no other convenient means (such as telephone circuits) of reporting outages are available to the customers. The majority of the "outage locators" are placed on automatic line switches or reclosers in these areas. Several companies which had considered using these devices reported that the customers in urban and suburban areas could and would report outages as fast by



Fig. 1—"Outage locator" in a substation reports breaker operation.

telephone as the information could be received on an "outage locator" system.

Recognize Limitations

While experience with outage locators varies from "a short time" to two years, several limitations have been recognized.

By their very nature, the devices require power from either a 120- or 240-v source and must, therefore, be located at such a point in the system that a secondary power supply is available even after the outage has occurred. This, of course limits their location to the actual location of the switch or recloser rather than somewhere out in the area served by that switch or recloser. In a gas or water system installation it may be necessary to request a service installation from the local power company if power is not already available. This may or may not be a simple matter, depending upon just how remote the installation is. Several potential users indicated an interest in a battery-operated device. The additional power supply adds cost to the installation, too.

Another limitation brought to light by the survey by nearly unanimous opinion is the lack of reliability of presently available equipment. Lack of reliability complaints seem to stem largely from false alarms at

the base station receiving and recording equipment rather than from false triggering of the transmitters.

These false alarms have been a great nuisance to some users and seem to be caused by certain voices and, in some cases, noise coming in on the base station receiver on the mobile channel, and having the right frequency to trigger the recording device. A number of these users suggested that a different system of coding of the tones and pulses be used to eliminate these false indications.

Two users reported the installation of these transmitters in remote unattended substations to indicate the operation of any of a number of oil circuit breakers. Both were quite pleased with the installations although one had had some trouble with false operations.

All but two of the reporting users surveyed reported that they had trouble with the transmitters failing to operate when called upon to do so by the associated switch or recloser. This, also, has not improved the opinion of their reliability. As one user put it, "An alarm system which you can't depend on to give an alarm isn't much better than no alarm system at all!"

Many users also felt that the presently available equipment required too much maintenance.

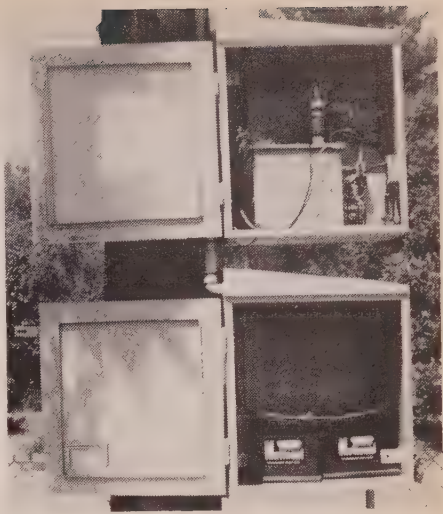


Fig. 2—When secondary is not available, batteries supply the "outage locator" here installed in a meter cabinet.

Another limitation is common to all these devices: Since they operate on regular mobile frequencies they monopolize the air just as any mobile unit or small base station transmitter would. For the average system this is no particular problem except for one thing: The period when the radio channel is fairly heavily loaded with voice traffic is the same period when these devices would be most likely to operate. This could conceivably block voice mobile-to-base communications at

Table 1—Summary of Experience and Comments of Users of "Outage Locators"

User	Type of Area	Customer Density	No. of Units in Operation	Approx. Range—Miles	Ave. Length of Time in Service	No. of Outages Reported	Trouble with False Indications	Not Operating When Called Upon	Maintenance Experience	General Comments
A	Urban	Heavy	1	—	2 Yrs.	—	—	—	Satisfactory	Hope to expand use when improved equipment is available.
B	Rural	Light	1	—	—	—	Yes	No	See Comment	Majority of trouble was with receiver-recorder unit—general idea is excellent but available equipment is less than satisfactory.
C	Rural	Light	11	35	2 Yrs.	8	Yes	Yes	See Comment	More maintenance required than was anticipated—used where customers don't have telephone service—materially reduces length of customer outages.
D	Rural	Light	33	45	—	24	Yes	Yes	Satisfactory	Reduces outage time by an average of 40 minutes.
E	Urban & Suburban	Heavy to Medium	13	35	1 Yr.	40	Yes	Yes	Satisfactory	Quite satisfied—ideal for fringe areas where telephones are not available to customers but still too expensive to justify on economic basis alone.
F	Rural	Light	14	20-25	About 1 Yr.	8	No	Yes	Not Good	Saves much time—makes good impression on customers—excellent in principle but not satisfied with presently available equipment.
G	Rural	Light	30	30	12-20 Mos.	26	Yes	No	Satisfactory	Excellent idea.
H	Rural	Light	8	20	2 Yrs.	1	Yes	Yes	Unsatisfactory	Would be very advantageous if they would work properly—receiver-recorder has been the source of most of the trouble.
I	Urban & Suburban	Heavy to Medium	3	—	1 Yr.	9	Yes	—	Fair	Future installation will depend on improved equipment becoming available and FCC permitting use for other functions.
J	Rural	Light	2	35	Short Time	—	—	—	—	Too short experience to comment but supplier has had much trouble in making the units work properly. General opinion negative so far.
K	Urban & Suburban	Heavy to Medium	2	28	8 Mos.	8	No	No	Satisfactory	Quite pleased so far.

inopportune times. However, remember that the information that is being reported would very probably otherwise be reported by mobile-to-base voice communication and would take even more time if reported in that manner.

Rules Need Revision

Limitation on use also comes from existing rules. The FCC's rules specifically provide in Part 11, Section 11.253, Paragraph (b), that, "A mobile service licensee in the Power Radio Service may be authorized to operate an Operational Fixed Station on any mobile service frequency above 25 mc already assigned to the licensee, where such fixed operation is for the sole purpose of automatically indicating failures in transmission and distribution systems."

The wording of this paragraph has been the cause for considerable discussion and undoubtedly a great deal of misunderstanding. The term "failure" is not specific enough to indicate just what is meant.

The wording used in the original petitions included the term "outage" and the "Report and Order" issued by the FCC in Docket 12028



Fig. 3—"Outage locator" at a platform substation where secondary power is available. Arrow indicates actual transmitter location.

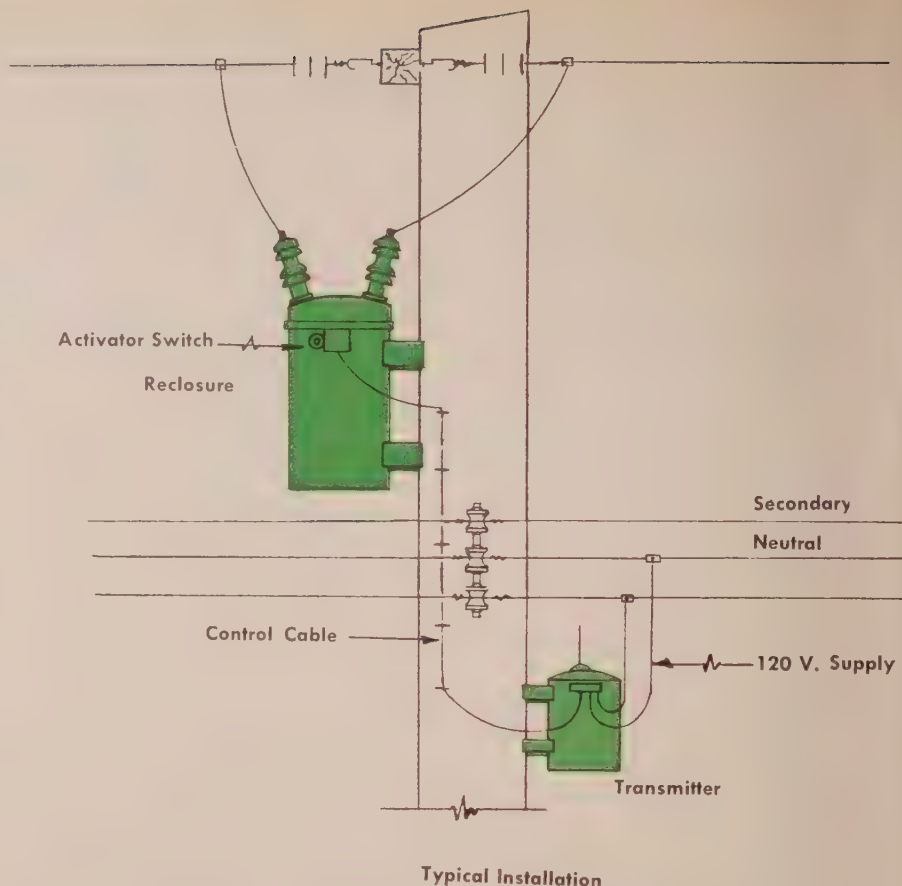


Fig. 4—Typical installation of "outage locator" shows it monitoring recloser operation.

specifically referred to "outages" on electric systems. The subsequent "Report and Order" which added the other licensees in the Power Service to the group eligible for this type of use also used the terminology "outage."

The rule itself, however, says only "failure" and this is quite ambiguous. Many users have indicated that they would very much like to use such remote unattended transmitters to give indications or alarms of abnormal conditions which, if not taken care of promptly, could result in outages. At present, the interpretation is such that only "outages" as such and not conditions which may lead to outages can be reported.

If the term "failure" is broad enough or can be made broad enough to cover this type of indication, it is apparent that there would be much more widespread application of this type of device. It could be used, for instance, to indicate abnormally low or high pressure on gas and water mains or excessive oil temperature in substation transformers on electric systems. It would be extremely desirable to be able to report overload or excessive flow

conditions which may be preludes to more serious trouble and outages to customers.

It has become evident, therefore, that the range of permissible functions needs to be broadened and it has been urged by various licensees that this be done, either by obtaining an interpretation of the existing FCC rule or by having the wording of the rule changed.

It has been recommended by the users and potential users that they and the manufacturers cooperate in developing and improving the equipment to increase its reliability both from the standpoint of reducing maintenance and also the elimination of false operation.

If these things can be accomplished the "outage locator" may well become as essential an operating tool to the electric, gas, water and steam utilities as mobile radio itself.

Acknowledgments

Grateful acknowledgment is made to Mr. Paul H. St. Pierre of the Narragansett Electric Company, Providence, Rhode Island, Chairman of the Engineering Subcommittee of the National Committee for Utilities Radio, and Mr. John F. Atkinson of the Rural Electrification Administration, Washington, D. C., for their most able assistance in collecting and assembling information from the users of the equipment discussed in this article.



Fig. 1—Single-pole disconnect switches like these are a common sight on looped distribution circuits these days.

SINGLE-POLE DISCONNECT SWITCH TESTS DETERMINE LOOPED-CIRCUIT BREAK CAPACITY

Since single-pole disconnect switches are quite commonly used for sectionalizing looped distribution circuits in urban areas, it is useful to analyze their operation under various load and voltage conditions.

By T. E. CURTIS, Chief Engineer, Electrical Apparatus, A. B. Chance Company

MANY TIMES, single-pole disconnect switches are called upon to open looped circuits. It is therefore desirable to investigate load current magnitudes that they might reasonably be expected to open.

Magnitude of current that can be interrupted by a disconnect in a loop circuit is an inverse function of the recovery voltage across the switch terminals. This recovery voltage can consist of transients as well as the normal-frequency recovery voltage.

However, since load currents are being dealt with in this instance and not fault currents, transients are small and can be reasonably neglected. Thus, normal-frequency recovery voltage as it affects the switching function will be considered.

If a loop circuit is fed from a common bus and if two halves of the loop have identical circuit and load characteristics, when the loop is opened there is no recovery voltage across the switch (in fact, there is no current through the switch prior to opening). Such a circuit is highly improbable, however. Under usual circuit conditions, voltage drop and phase shift cause a normal frequency recovery voltage after switch opening. Magnitude of this voltage is a function of loads and circuit characteristics and will vary from time to time in the same circuit.

A series of tests was recently conducted using a 7.5-kv, 600-amp porcelain enclosed disconnect switch to break various values of load currents under various recovery voltage conditions. Such a switch is shown in Fig. 1. Test re-

sults of a single specimen are shown in Table I.

The 1040-v value shown in the table represents a phase shift of 25 degrees on a 2.4-kv distribution circuit and 14.5 degrees on a 4.16-kv distribution circuit. Also, it might represent a 10 percent differential in voltage and a 26-degree phase shift at 2.4-kv or a 10 percent voltage differential and a 14-degree phase shift at 4.16-kv.

An oscillogram of one of the in-

terrupting tests is shown in Fig. 2.

Even though the same specimen was used for all tests in Table I, in no case did it fail to properly interrupt the load current. Contacts were slightly burned, but the switch was in good operating condition, and would carry its rated full load without overheating.

Although tests were conducted on a 600-amp switch, similar performance can be obtained with 200- and 400-amp ratings.

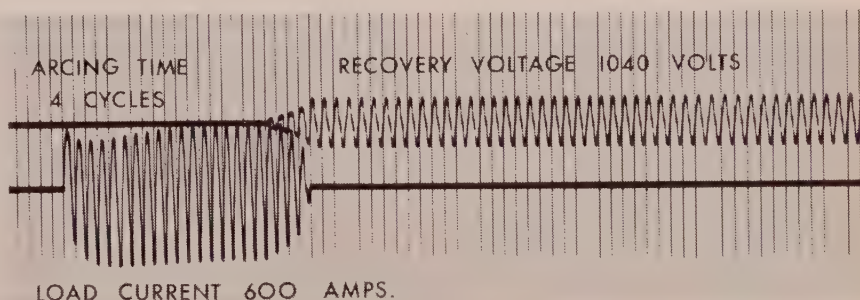
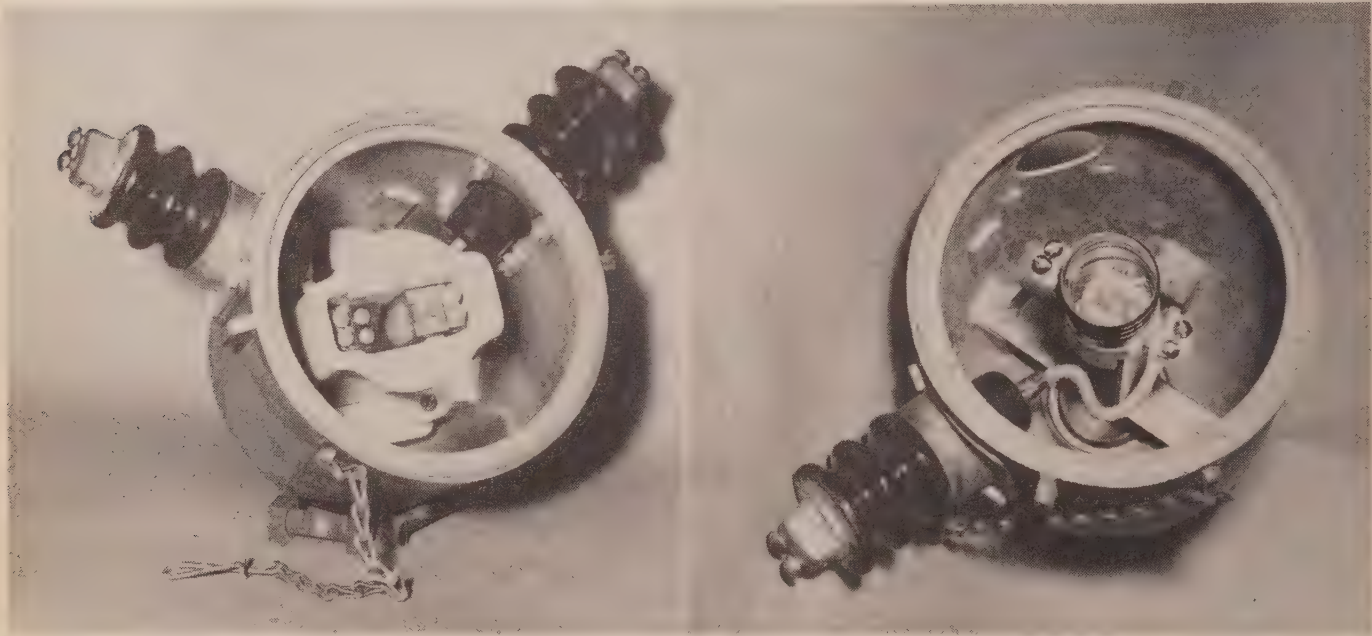


Fig. 2—Oscillograms help analyze severity of conditions which can confront a single-pole disconnect switch on a looped distribution circuit.

TABLE I
Current vs. Recovery Voltage

Current (amperes)	Voltage (volts)	Current (amperes)	Voltage (volts)	Current (amperes)	Voltage (volts)
91	111	430	219	440	600
91	111	200	342	440	600
355	111	200	342	525	600
355	111	200	342	525	600
355	111	265	342	525	600
215	219	265	342	585	600
215	219	265	342	585	600
215	219	325	342	585	600
270	219	325	342	650	600
270	219	325	342	650	600
270	219	405	342	650	600
360	219	405	342	510	1040
360	219	405	342	600	1040
360	219	440	600	600	1040
430	219	440	600	600	1040
430	219	440	600		



Streetlight hood with old series socket and bushing (left). At right, a multiple socket has been installed and one bushing adapted to the new socket.

Series-To-Multiple Streetlight Hood Conversion Means Ample Saving

By ARNIE RENTMEESTER

Electric Distribution Clerk

Wisconsin Public Service Corporation

A substantial saving in converting of streetlight hoods from series to multiple circuits has been effected at Wisconsin Public Service in Green Bay by development of a method of retaining the series bushings and adopting them to a new multiple socket.

After the series socket has been replaced with the new multiple socket, the internal rod is removed from the bushing. It is not necessary to remove the porcelain portion of the bushing, just remove the rod by loosening the set screw on the external terminal and unscrewing it from the rod.

Cut the rod to the desired length: in this case 4¼ inches. Using one quarter of a No. 2 solid copper sleeve, splice a piece of No. 8 or No. 10 stranded copper wire with asbestos covering to the rod.

In some cases, the rod from the series hood is small enough to use

No. 4 stranded copper sleeve to make the splice. This smaller sleeve will require less wire fill for the flexible No. 8 or No. 10 end and may be preferred over the No. 2 sleeve. In this case, however, a small washer will have to be used to prevent the rod from wiggling around in the porcelain bushing. The No. 2 sleeve will nestle snugly in the porcelain bushing.

The savings involved on each streetlight hood conversion is \$8, since we are eliminating the need for two new bushings at \$4 each. It has been estimated that at Public Service we are going to convert about 200 streetlight hoods this year. So the total savings will be about

\$1600. Since awards in our employee suggestion system are up to one fourth of the first year's savings to the company, this idea won a \$400 award in our suggestion system.

In addition to material savings, there will also be some labor saving through use of this conversion method since the bushings do not have to be removed from the hood. Each bushing has four bolts.



At right is an old series bushing. At left, is converted bushing with rod cut to proper length and copper sleeve and asbestos wire installed.

Another Step in 345-Kv Research

Shielding Test Equipment To Ohio Power

Five hundred shielding failure indicators, designed by General Electric to measure the effectiveness of transmission line shielding, have been shipped from the company's transformer department to the Ohio Power Co. of the American Electric Power System.

The indicators will be used in lightning flashover studies on AEP's 345 kv transmission towers being conducted jointly between the two organizations. Installed on insulators, they will provide a means for comparing the number of flashovers caused by lightning striking the phase conductor to the number caused by lightning striking the shielding tower, or its ground wire.

By studying the resulting data, utility engineers hope to be able to determine the optimum shielding angle for the existing ground wire; whether or not an additional wire might be required; or if additional

insulators will be the most feasible solution to the flashover problem.

The indicators, designed by engineers John Anderson and Remo Giacomoni, are essentially a copper winding on a toroidal iron core, completely encapsulated in epoxy resin. The core is split to provide easy snap-on installation on the insulator. The winding is loaded with an encapsulated resistance, the terminals of which are connected to two electrodes of a Lichtenberg figure recorder. According to Anderson, the resistance is necessary in the circuit because the waveshape of the output voltage must be the same as the waveshape of the input current.

Mr. Giancomoni explained that the indicator actually records whether lightning travels from the crossarm of the tower to the conductor or vice-versa. By making an assumption which is about 90 per-

cent accurate (that lightning is of negative polarity) the device makes it possible to determine the cause of flashover by registering the direction of the lightning current on the Lichtenberg figure recorder. This is possible because a flashover caused by a lightning bolt to the tower or ground wire causes current to flow from the conductor to the crossarm. Flashover caused by a lightning strike directly to the conductor has reverse polarity, from the crossarm to the conductor.

Because the core of the device is saturated by the 60-cycle current which follows the lightning flashover, the record of the lightning current is permitted to remain intact. The shape of the Lichtenberg figure provides a way of positively identifying the polarity of the current flow.

Since film must be replaced after each exposure, the recorder is designed for one-shot operation.

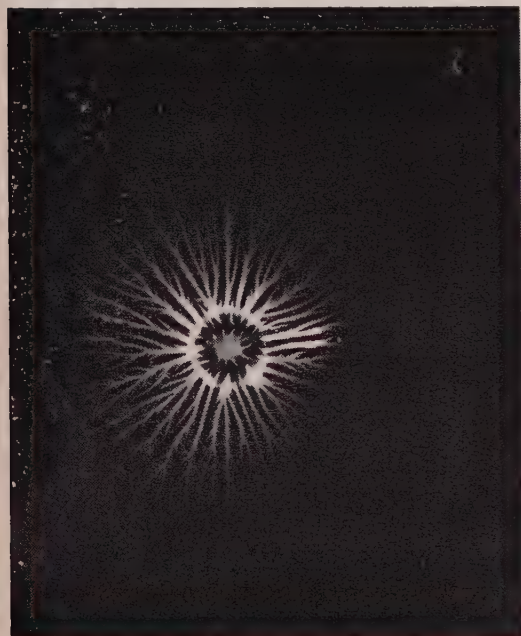
According to GE, the recorders will be placed on 500 towers in a 100 mile line section.

Federal Pacific Acquires Pioneer Electric, Ltd.

Federal Pacific Electric Co. has contracted to acquire Pioneer Electric, Ltd., Winnipeg, Man., one of Canada's leading electrical equipment manufacturers. It will pay about \$5 million in cash and stock.

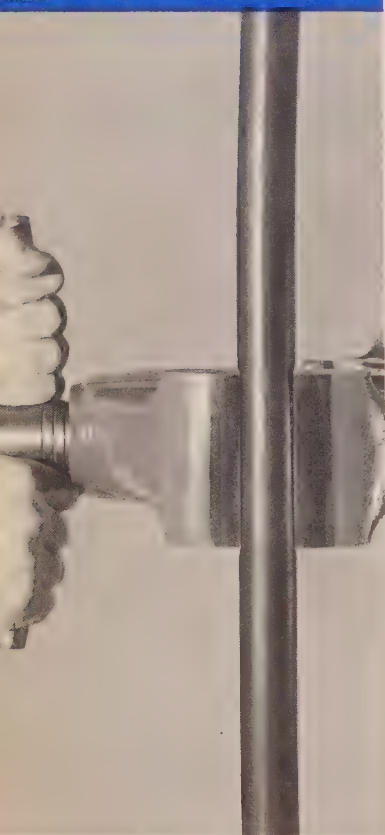
Pioneer manufactures a broad range of products including power transformers, unit substations, high-voltage switchgear, cable trays, underfloor raceways systems, industrial furnaces, electric heating systems, and special control devices. It operates five plants in Canada at Red Deer, Brandon, Regina, Toron-

(Continued on page 90)



Lichtenberg figures on lightning shielding failure indicators show current direction if insulators flash over when lightning strikes a transmission line. A positive figure (left) is recorded if the insulator flashover occurs after a conductor is struck. A flashover following a strike to the line's shielding (ground wires or towers), causes the smaller, negative figure (right).

**Neoprene resists
COLD FLOW**



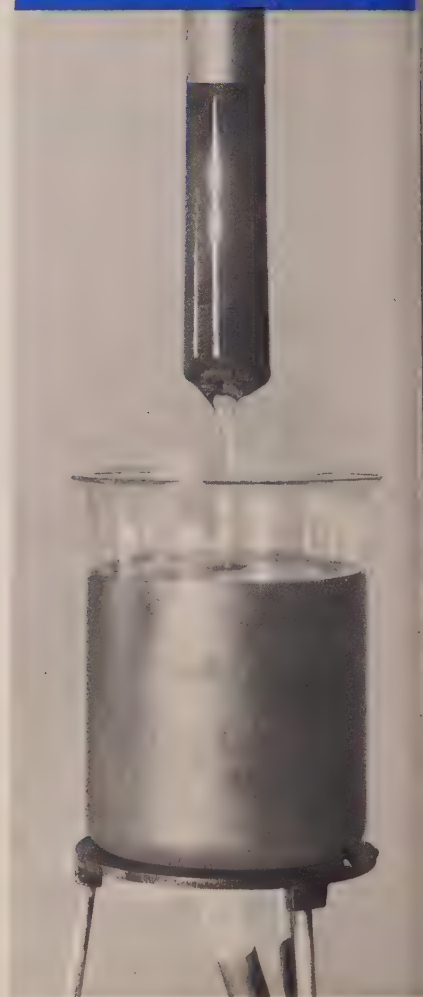
In laboratory tests and on the job, neoprene synthetic rubber has proved its ability to resist permanent deformation under load. It stays tough, resilient at high and low temperatures. Other cable jacketing materials get brittle when cold, soften when heated, flow when compressed. Not neoprene.

**Neoprene resists
IMPACT**



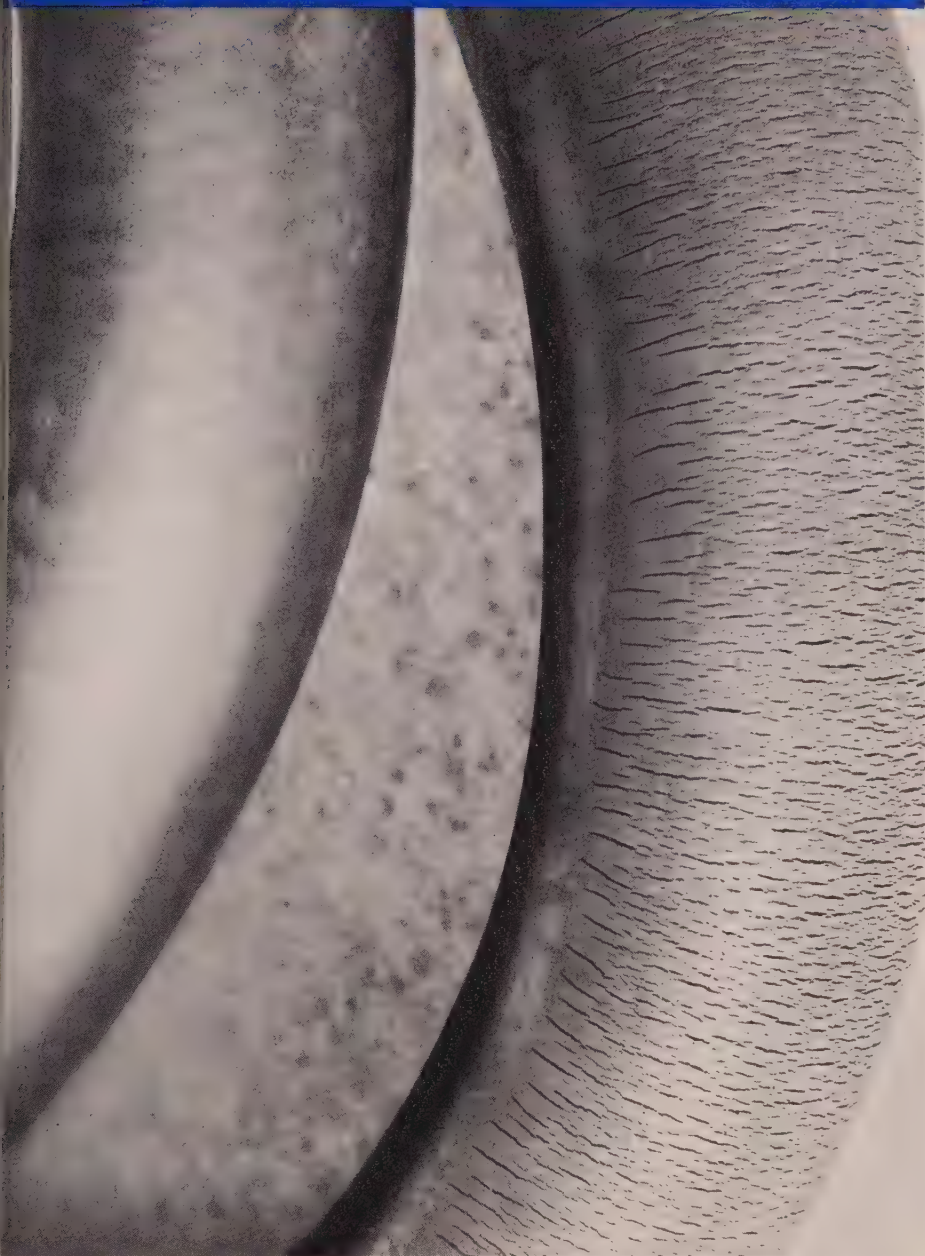
Neoprene is a tough, resilient jacketing that can take impact and abuse. In the most severe mining service it has proved its ability to withstand abrasion ... to resist gouging and tearing. It surpasses other cable jacketing materials in laboratory impact tests. It gives your cable the best protection available against abuse.

**Neoprene resists
HEAT... OIL**



Neoprene jacketing resists exposure to oil, grease and a variety of chemicals and solvents. Its resistance to heat protects insulation at temperatures as high as 250° F. In addition, neoprene is flame resistant; it will not support combustion, an important factor among safety-conscious cable users in factories, refineries and mines.

SUNLIGHT...WEATHER



Installed January 6, 1935, these two test lengths of electrical cable have been exposed out of doors to rain, snow, sun, ozone and industrial fumes for over a quarter century. One jacketed with ordinary rubber (right) is badly cracked, furrowed, embrittled. But the neoprene jacket (left) is still sound, tough, resilient—still able to give complete protection to the cable.

PROVED

**IN A QUARTER CENTURY OF INDUSTRIAL SERVICE
—THERE'S NO DOUBT ABOUT NEOPRENE JACKETING**

For more information, write to: E. I. du Pont de Nemours & Co. (Inc.),
Elastomer Chemicals Dept. EL-9, Wilmington 98, Delaware.



**NEOPRENE
SYNTHETIC RUBBER**

Better Things for Better Living . . . through Chemistry

**Neoprene resists
SUB-ZERO COLD**



In the arctic, neoprene synthetic rubber is used to protect radar domes—and you can use this cold weather durability in cable that must serve outdoors in frigid winter weather. Neoprene jacketing stays flexible and resilient at low temperatures . . . successfully meets specifications for military cable designed for use at -65° F.

NEW DS

DELTA-STAR CRYSTAL VALVE LIGHTNING ARRESTER

- 20% Shorter
- Balanced Design
- Easier to Handle
- Lower Discharge Voltages

The new "Type DS" Crystal Valve Lightning Arresters are shorter and lighter, for easier handling and installation. Size and weight savings have been achieved while keeping the "Balanced Design" which has made Delta-Star Crystal Valve Arresters top performers for thirty-five years.

For complete information on the new, easier-to-install "Type DS" Crystal Valve Lightning Arresters, write to *Delta-Star Electric Division, H. K. Porter Company, Inc., 2437 W. Fulton St., Chicago 12, Illinois.*

New "Type DS"
Lightning Arrester
cuts off four
inches in the
popular 9 KV size
a 20% reduction
in length.



DELTA-STAR



ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

Federal Pacific—from p. 87

to, and Winnipeg. Annual sales are approximately \$6 million.

Federal Pacific's Canadian subsidiary, FPE Canada, Ltd., operates three plants at Toronto, Granby, and Vancouver for production of control, distribution, and power equipment as well as fluorescent lighting fixtures. The combination of these two companies gives Federal Pacific a complete product line in Canada and makes it third largest of Canadian electrical equipment manufacturers, according to T. M. Cole, president of the firm, headquartered at Newark, N. J. Advanced transformer designs and other products which Federal Pacific will be able to market in the United States were another factor in the acquisition, he indicated.

Pioneer's transformer line consists of distribution and power transformers ranging in size from 3 kva to 60,000 kva, rated up to 230 kv. Included are dry, oil-filled, and gas-filled types, as well as associated load tap changing mechanisms.

Westinghouse to Build 600,000-kva Transformer

A 600,000-kva power transformer, with 50 percent more capacity than any now in use will be built by Westinghouse Electric Corp. Planned for delivery to a midwest utility in June 1962, it will be built at the Westinghouse plant now under construction at Muncie, Ind.

The new unit will raise the generated voltage from 20,000 to 138,000 volts so that power may be transmitted economically to the load center. Eclipsing the previous record transformer of 400,000-kva rating, also built by Westinghouse, it will weigh approximately 300 tons. Dimensions are to be 24½ ft. high, 26 ft. long, and 20 ft. deep.

The new plant at Muncie will have increased facilities. These, accompanied by technological developments in transformer manufacture, will enable the company to build such large units. Production at the new plant is expected to begin the latter part of 1961. Design work for the new transformer is starting immediately.

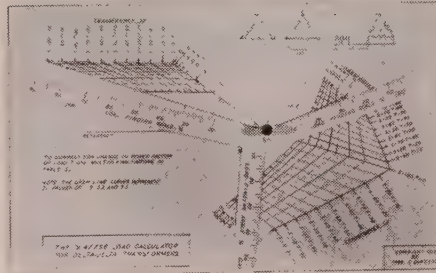
NEW PRODUCT



DESIGN

DeWeese Calculator Simplifies Transformer Loading Calculations

The DeWeese Calculator enables an engineer to perform in minutes calculations that would require much longer by conventional means, and with an accuracy equal to values derived by symmetrical components, now considered to be the most accurate method available for finding the load division between transformers connected delta-delta or four wire primary-delta secondary. With the calculator it is possible to rapidly find the maximum load that can be imposed on a given bank of transformers without exceeding the kva rating of either transformer, the load taken by each transformer in the bank, which transformer limits the load



carrying capacity of the bank, and minimum and relative size transformers required for a given load. Operation is independent of whether the load is all single phase, all three-phase, or any combination thereof.

Circle item #24 on reply card

Conductivity Monitor

Model 4957 Conductivity Monitor by **Leeds & Northrup Co.** continuously indicates an electrolytic conductivity measurement. Unit can be supplied with automatic or manual temperature compensation and with continuous alarm signaling. Unit also produces an output d-c signal for transmission to a recorder or other data-logging equipment. Also available is the model 4958, portable unit for on-location checking.

Circle item #26 on reply card



Circle item #25 on reply card

HV Power Supplies

Ruggedized high voltage power supplies for precision performance with primary nuclear detectors are available from **General Electric**. The single or dual supplies provide positive or negative high voltage output with a range of 500 to 1500 volts d-c. Front panel-mounted meter provides constant indication of output. Voltage set switch is used for course control and a 100-v vernier adjustment is provided for fine control.

**Prevent
ground-line
decay with**

**CHAPMAN
POL-NU**

Add years of life to in-service poles

Major savings in pole replacement costs are possible with a planned inspection and treating program using Chapman POL-NU. This superior grease-type preservative containing a full 10% pentachlorophenol restores natural losses of the original preservative in the critical ground-line area to add years of life to standing poles.

Pol-Nu Bandage-Maker slashes ground-line treatment costs

Maximum economy and effectiveness in the application of ground-line treatments are achieved with the Pol-Nu Bandage-Maker. This portable device prepares, as needed in the field, ground-line preservative bandages.

Improved Pol-Nu Pak

For those who prefer a factory-sealed, ready-to-use pole bandage, the Pol-Nu Pak offers real advantages. May be applied instantly by maintenance crews, is easy to stock and handle.

POL-NU
and Pol-Nu Bandage-Maker

CHAPMAN CHEMICAL COMPANY

Leading manufacturer of wood preservatives
MEMPHIS 1, TENNESSEE

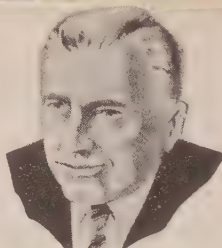
Palo Alto Cal. • Portland, Ore.
Minneapolis • Charlotte, N. C.

Mail coupon for complete data

Chapman Chemical Company
P. O. Box 138, Memphis 1, Tenn.
Please send your folder, "Preventive Maintenance For Poles", to:

Name _____
Company _____
Address _____

®Trademark



"We like to do business with the Fanner Superformed Folks"... **PURCHASING AGENT**

"Our transmission-line construction is done on a 'bid-job' basis. But we insist on reliable sources for *every item* of work and equipment, because we must protect customer service and large investments.

"Take even a relatively small item, like connecting materials... we find that the Fanner folks, both Factory and Agent, are the kind we like to deal with. They *measure up*... Quality, Service, Price, Performance... and, above all, **INTEGRITY**."

No one knows better, than a Purchasing Agent, "Who's Who" among the Suppliers.

A-1607A

FANNER

Superformed
with a

"PROTECTIVE TWIST"

ARMOR RODS...

Protect long-span T&D lines at supports

LINEGUARDS...

Protect short-span T&D lines at supports

PATCH RODS...

Repair damaged conductors

TAP ARMOR...

Protects conductor at tapping points

FANNGRIPS...

For dead-ending strands and conductors

FANNSPLICES...

Join two ends of conductor wire

PLASTIC PRODUCTS...

For conductor surface protection

FANNER

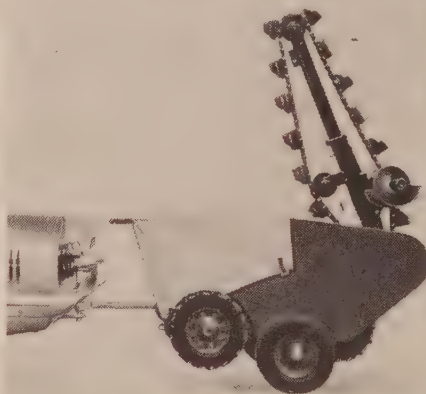
The Fanner Manufacturing Co.
Brookside Park—Cleveland 9, Ohio
Division of Textron, Inc.



Side-Break Switch

A braidless, center, side-break switch is now being made by **Southern States Equipment Corp.** Designated Type GG, the switch is available in voltage ratings from 34.5 kv through 161 kv and in continuous current ratings of 600 and 1200 amps. Features a unique swivel assembly, providing low resistance current transfer points, adequate capacity for short circuit current, and freedom from corrosion and contamination.

Circle item #27 on reply card



"Compact" Trencher

Auburn Machine Works has introduced the Auburn Compact, a self-propelled trencher with single unit body construction. Transport wheels raise and lower hydraulically, eliminating the need for trailer hauling from site to site. Unit has four wheel drive in both forward and reverse and is hydraulically driven for maximum trenching speeds, under varying soil conditions, up to 500 ft/hr. Has non-clogging digging bits.

Circle item #28 on reply card



"It's sure a good feeling to know that this wire is attached to Haley cross arms!"

Haley's

CEDAR POLES
and
FIR CROSS ARMS

Light in weight and clean. PENTACHlorophenol treated in our modern plant for protection against decay, moisture and insect damage.



TWO strategically located yards:

**MINNEAPOLIS,
MINNESOTA**

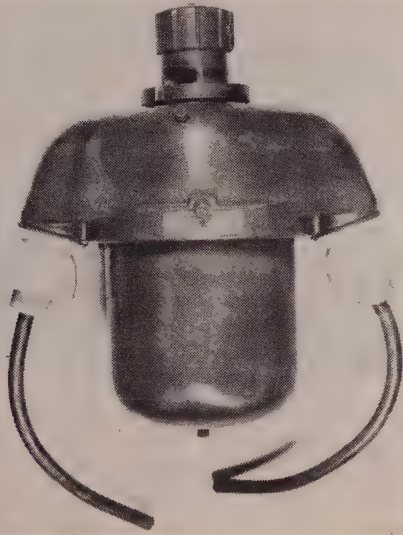
FINDLAY, OHIO

R. G. HALEY & CO.
SPITZER BLDG.
TOLEDO 4, OHIO

Oil Cutouts

Two oil cutouts with applications for load switching and over-current protection have been announced by **General Electric**. Rated 15 kv, 200 amps, one has a 7000 amp interrupting capacity, and is lighter and smaller than any other of similar rating. The other, 7.8 kv, rated 200 amps, has a 5000 amp interrupting capability, incorporates improved components and higher rating in same exterior dimensions.

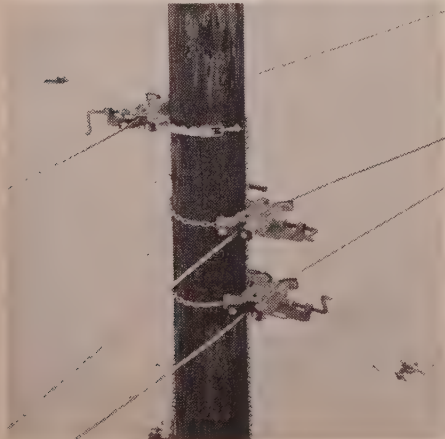
Circle item #29 on reply card



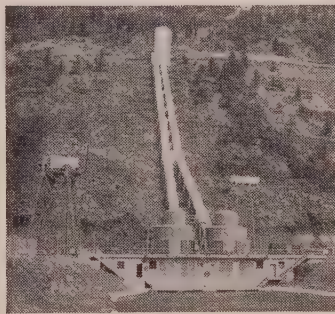
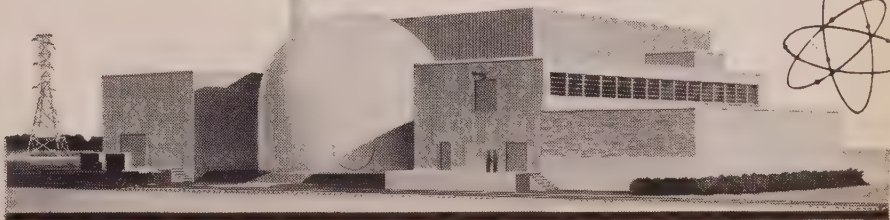
Wire Stringing Brake

The Wanner-Way Brake was designed to provide an efficient, yet inexpensive method of maintaining a constant tension on new wire being installed over or through energized conductors. Braking resistance is applied directly to the wire rather than to the reel, allowing an easier and finer degree of control. Amount of resistance is adjustable. The brake will take wire from #6 through 4/0, either bare or covered. By **Arch T. Flower Co.**

Circle item #30 on reply card



**Which Pioneer service
do you need to
complement your own staff?**



DESIGN AND CONSULTING ENGINEERING SERVICES

Pioneer specializes in designing power plants and offers design service for fossil fuel, hydro and atomic plants. It will also assist in forecasting load growth, in site selection, in purchasing and expediting of equipment and construction management. Pioneer's other services include substation, transmission and distribution studies and design.

SERVICES IN REGULATORY MATTERS

Pioneer offers its services in all phases of Federal, State and local utility regulation, including natural gas and electric rate matters, certificate proceedings, licensed project accounting requirements, depreciation studies for rate case and income tax purposes, cost allocations and special studies.

CORPORATE SERVICES

Pioneer offers its services as business and management consultants; stock transfer and dividend disbursing agents; financial, accounting and tax consultants.

Write for Booklet "PIONEERING NEW HORIZONS IN POWER"

*Serving Electric Utilities and
Industrial Power Users Since 1902*

Pioneer Service & Engineering Co.

231 SOUTH LA SALLE STREET • CHICAGO 4, ILLINOIS

FROM EVERY POINT OF VIEW



MARK I LUMATROL, *Tubeless*
(Actual Size)
NEMA MOUNTING

THE NEW MARK I **LUMATROL**[®] GUARANTEES
HIGHEST RELIABILITY AT LOWEST COST
IN AUTOMATIC STREET LIGHT CONTROL

Write for complete specifications

MICRO BALANCING, INC., HERRICKS ROAD, GARDEN CITY PARK, L.I., NEW YORK

In Canada: J. R. Kearney Corp., Box 270, Guelph, Ontario

UTILITY TEAMS UP . . .

(Continued from page 58)

power during the low-load night hours, a particularly important factor at this particular time of the year.

Sixteen Manufacturers

Sixteen home-laundry appliance manufacturers agreed to participate and the promotion was set for the 60-day period from October 1 to November 30. The sixteen were: Blackstone, Dexter, Easy, Frigidaire, General Electric, Hamilton, Hotpoint, Kelvinator, Maytag, Norge, Philco, RCA Whirlpool, Roper, Sears-Kenmore, Speed Queen and Westinghouse.

Any customer of Long Island Lighting, who purchased any one of these 16 dryers from a LILCO authorized appliance dealer during the promotion period, received an electric blanket free of charge.

Salesmen's Contests

Two contests were set up for the dealer salesmen. One involved the prize of a free weekend in New York for two, to the salesman selling the most dryers in each of the utility's five sales areas. The second contest involved a drawing based on all sales reports submitted throughout the campaign from all areas of Long Island Lighting's territory. Ten transistor radios, valued at \$40 each, were given to the dealer salesmen whose names appeared on the sales report forms drawn by lot.

In line with its policy of concentrating on low saturation and new appliances, Long Island Lighting is planning campaigns involving dish washers, color TV, freezers and dehumidifiers, as well as dryers. Under consideration are plans to offer as incentive bonuses to customers such items as calendar towels or possibly the Easy-Care No-Iron sheet which proved so successful in an industry-wide campaign sponsored by the American Home Laundry Manufacturers' Association. Whatever the premium, it will be a real incentive to our customers to increase their use of power.



UNIVERSAL TURRET DERRICK

A detailed technical diagram of the Truco Turret Derrick. It shows the derrick in three different mounting positions: "Behind Cab", "Left Rear", and "Right Rear". A large red number "3" is placed next to the text "MOUNTING POSITIONS". The diagram illustrates the hydraulic arms, sheaves, and the central turret mechanism. Labels "Left Rear" and "Right Rear" are placed near the base of the derrick's legs, and "Behind Cab" is placed near the central turret.

3 MOUNTING POSITIONS

Behind Cab

Left Rear

Right Rear

YOU GET the derrick position you want when you buy Truco. Here are all the fine features of the famed Truco Turret Derrick now offered in your choice of three mounting positions for the job best suited to your truck body. Not only that, Truco offers full 360° rotation of the turret. You spot the load where you want it, dig the hole, set the pole with the positive safety and dependability of hydraulic operation.

Unitized Construction	Digger Stows Automatically
Full 360° Rotation	30 Foot Sheave Height
No Exposed Moving Parts	Adapts to Standard Line Bodies
8,000 Pounds Capacity	Optional 1-Man Fiberglass Basket

See your Truco dealer or representative for full details or write for illustrated literature.

TRUCK EQUIPMENT CO.
3963 WALNUT STREET / DENVER 5, COLORADO

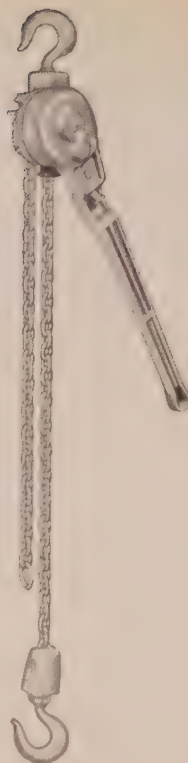
AGAIN . . . Coffing Brings You a New Line of Hoists

The new Safety Pull Aluminum Ratchet and Pawl Lever Hoist is easy to operate—requires minimum handle pull. It may be operated from either side, and the design prevents freezing a load.

Safety has been built into the hoist. It will not ratchet under load if handle is released nor will it free chain. Controls are protected from inadvertent shifting. The bottom stop eliminates any hazard from the handle being released unintentionally. The exclusive safety handle bends to indicate overload.

Strength without excess weight in the new hoist is achieved by a special aluminum alloy which is used in the body and handle.

Available in six models with capacities from $\frac{3}{4}$ to 6 tons. Ask your distributor or write for Bulletin ADH-86.



COFFING HOISTS



DUFF-NORTON COMPANY

Four Gateway Center • Pittsburgh 22, Pa.



IMPULSE TESTED

Eisler has built transformers of all types for 38 years, and there's a complete range available up to 500 KVA. Our engineering staff will welcome the opportunity of working with you on your standard and special requirements.

TRANSFORMERS



DRY TYPE and LIQUID FILLED • STANDARD and SPECIALS

EISLER TRANSFORMER COMPANY, INC.
20 NORTH SALEM STREET, DOVER, NEW JERSEY

138-kv Substation—from p. 63

design concept was evolved. Typical arrangements are in Fig. 4.

The only disadvantage to the unit concept is the increased ground space required in comparison to a standard bay-type structure. Investigation showed this to be approximately one-half acre more for a large bulk-power substation. The additional land requirements are usually reflected only in an economic comparison between a bay-type and unit-type design, and seldom constitute an important factor compared to savings which can be effected with the unit-type design.

However, in certain locations, the additional ground required is not available or cannot be acquired without offsetting savings which can be made with the unit-type design. For these locations, the same principles used for unit structures were applied to a bay-type design.

In particular, the line was again dead-ended on the separate structure instead of on the equipment bay. Thus, the bay can be reduced to a width determined only by spacing required for disconnect switches and rigid bus. Result: a minimum size and weight bay. The unit concept was again applied as much as possible and a standard bay was developed. It can be made up of three standard steel assemblies which can be assembled to satisfy any electrical requirements (See Fig. 5). This reduced bay design requires considerably less ground space and is more expensive than the equivalent unit-type structure and cannot economically be used for a ring bus.

As a result of this study, it was established that either of these two designs, the unit or the standardized bay-type structure, would satisfy any conditions expected on our system.

As a final step, economic comparisons were made for typical installations using the unit, bay, and a recent design. An example of one comparison is shown in Table II.

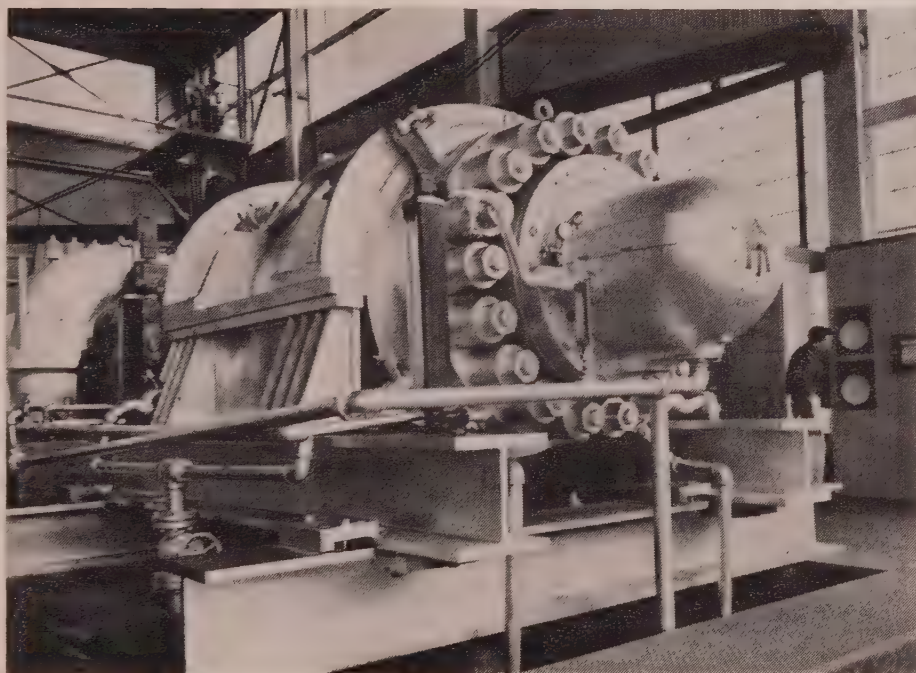
As a result of this study, it has been decided that Commonwealth Edison system standard for 138-kv installations will be of the unit-type design, unless ground space is limited, in which case the reduced bay design will be used.

SUPPLY



FACILITIES

Huge Boiler-Feed Pump Tested By Ingersoll-Rand



Huge 22,000 bhp, 7200 gpm pump under test at the Ingersoll-Rand hydraulic test facility at Phillipsburgh, N. J. The 42-ton unit will handle the full load boiler feed water requirements for AEP's 450 mw addition to the Philip Sporn Plant.

Ingersoll-Rand Co. has completed and is now testing a 22,000 bhp, turbine-driven boiler-feed pump. Slated to go into service late this year, at the Philip Sporn Plant's new 450 mw generating unit, the feed pump will handle 7200 gallons of feed water per minute at 4550 psig discharge pressure.

Considered the world's largest

boiler-feed pump in terms of horsepower and capacity, the single unit will handle the full load boiler feed water requirements for the new generating unit, representing a departure from American Electric Power's multi-pump systems used in the installation's four older generating units.

Preformed Line Products Co. Expands Plants, Offices

To expand manufacturing and office space at its Cleveland headquarters, Preformed Line Products Co. has acquired two three-story buildings adjacent to its own main plant. The buildings were formerly occupied by Ohio Piston Co. and Standard Pattern Works. Production capacity of the Preformed company is almost doubled by this move, according to T. F. Peterson, Jr., vice president—manufacturing.

Major construction is now underway to combine the two new proper-

ties with the existing plant for manufacturing, warehousing and shipping. Plans also include modern spacious sales, manufacturing, and accounting offices. Net space gained at this location is more than 37,000 sq. ft. With the addition recently completed to Preformed's second plant at Palo Alto, Cal., the company has increased operating and office space by more than 65,000 sq. ft.

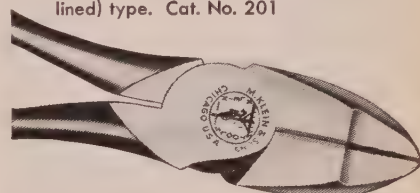
Blueprints are now being drawn for a further expansion of the Preformed Research and Engineering Center in Cleveland. This will increase total area of the present testing laboratory by 50 percent.

KLEINS

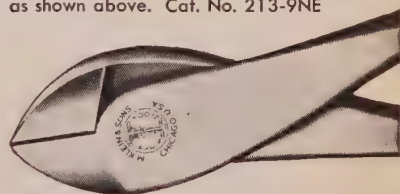
for LINEMEN
and ELECTRICIANS



The Original Klein Side Cutting Plier—Also available in NE (Stream-lined) type. Cat. No. 201



High Leverage Plier—Extra high leverage permits cutting extremely tough wire. Also available in the standard type as shown above. Cat. No. 213-9NE



High Leverage Oblique Cutting Plier—A recently introduced plier designed to cut toughest wire. Cat. No. 228-8



Electrician Conduit Plier—Reams inside and outside of conduit, tightens lock nuts in outlet boxes. Cat. No. 333-8

"Since 1857" the name Klein has stood for the finest in tools and equipment for linemen and electricians. It is the uncompromising high quality back of the name Klein that has won Klein Pliers their place in the hands of men who know good tools. Klein Pliers are now available in a wider variety of styles and sizes than ever before. Be sure the pliers you need carry the Klein trade-mark.



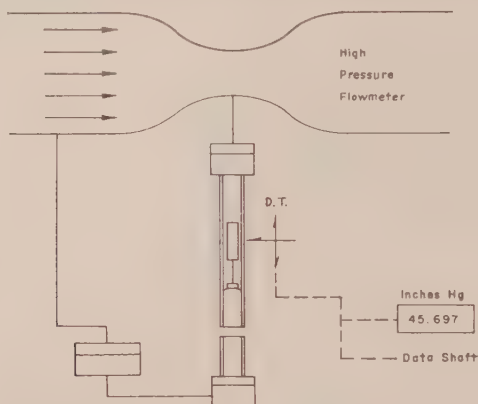
Klein Catalog Free—This new Klein catalog giving complete information on Klein tools and equipment for linemen and electricians will be sent on request. Write for your copy.

Ask Your Supplier—Foreign Distributor: International Standard Electric Corp., N.Y.

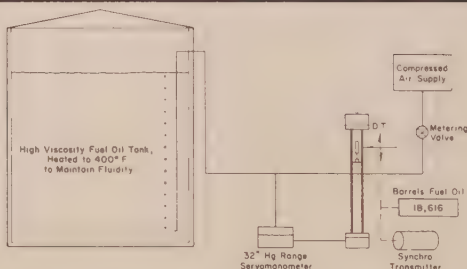
Mathias **KLEIN** & Sons
Established 1857
7200 McCormick Road • CHICAGO 45, ILLINOIS



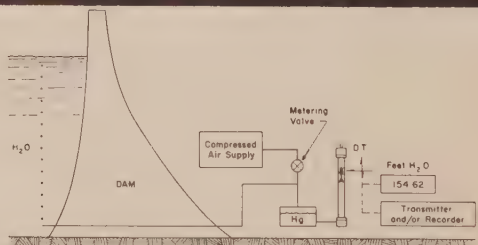
3 new servo techniques for measuring flow or liquid level in the power generating field



1. Precision flowmetering For accurate, reliable and safe measurement of feed water flow in turbine performance tests, Exactel Servomanometers utilize stainless steel manometer tubes and high pressure construction. Initial installations employing this method have drawn enthusiastic reception from utility companies throughout the United States.



2. Tank gaging Technique for gaging residual fuel oil tank on bubbler principle uses method which has proved ideally suited for tanks maintained at high temperature, or which contain radioactive or other liquids which pose problems for direct measurement.



3. Transmitting/recording water level in hydroelectric reservoir Technique uses bubbler principle with mercury filled Servomanometer with range of approximately 7½% of maximum water depth.

Exactel Servomanometers are *operational* instruments. Each of these techniques has been proven in a wide range of applications to have exceptional accuracy, simplicity and the reliability required for industrial installations. A major advantage of applications 2 and 3 is that they use a "weighing" principle. They respond to pressure but are insensitive to changes of specific gravity caused by temperature variation, absorbed gases, etc. The method offers digital readout, synchro transmitter and 25 optional features. Exactel's sixteen page Bulletin 500 describing new Servomanometer techniques and many new applications is available on request.

EXACTEL INSTRUMENT COMPANY
185 Evelyn Avenue / Mountain View, California / YO 8-6558

Sales Briefs

Richard Donnelly Co., Suffield, Conn., is newly named manufacturer's representative for the complete line of **Dynaray** Emergency Lighting Equipment and Systems. Warehouse facilities for the line, of Dynaray Division of Electro Powerpacs, Inc., Cambridge, Mass., will be in Boston and New York City.

Harvey Aluminum announces the appointment of **Peabody Brothers** (Frank J. and George A. Peabody) as sales representative for the company's new aluminum rigid conduit. With offices at 2903 St. Louis Street, Dallas 26, Tex., and at 240 Shea Place, Houston, Tex., the brothers will represent Harvey Aluminum conduit in Texas, Louisiana, Arkansas, and Oklahoma. **John Carder, Jr., Company** will be the new Harvey Aluminum Sales representative in the states of New Mexico, Utah, and in El Paso, Tex., with offices at 1624 First Street, N.W., Albuquerque, N. M., and 1415 S. Main Street, Salt Lake City, Utah.

Kaiser Engineers International, division of Henry J. Kaiser Co., is the new name of Kaiser's Heavy Construction Division. The name was changed to define more adequately the scope of the division activities. General manager will be John Hallett, a vice president of the parent company. He will be responsible for all engineering and construction activities outside of the United States and Canada.

To expand and strengthen field operations of **Datamatic Division** of Minneapolis Honeywell Regulator Co., 10 new sales offices have recently opened. They will be concerned with sales and service on Honeywell 800 and 400 electronic data processing systems. The new offices are in Atlanta, Cincinnati, Cleveland, Houston, Minneapolis, Philadelphia, Pittsburgh, San Francisco, Portland, Ore., and Albany. Branch offices previously opened in Boston, New York, Washington, Chicago, Detroit, and Los Angeles.

PRODUCTION BRIEFS

Standard meters may be converted to special purpose meters in small quantities, according to **Ram Meter, Inc.** The organization can make the conversions quickly and economically to comply with customer requirements.

The organization has been servicing all makes of meters since 1936 and is authorized for warranty service on all Simpson Electric Co. and Westinghouse meters, and R.C.A. test instruments. The company, located in Ferndale, Mich., carries a full complement of parts to give fast, reliable service.

A \$1.25-million improvement and expansion program will be completed this month at the **H. M. Harper Co.** The program, including the construction of four buildings, plus much new equipment, was begun last year. The new facilities will up production of Harper's Stainless steel alloy by about 300 percent.

New facilities have been started by **Performance Measurements Co.**, Detroit, Mich. The company manufactures instruments for control and testing incorporating a digital readout that electronically measures load-thrust-temperature-flow-voltage-pressure-displacement and electro-mechanical systems.

Rounding out a line of lighting standard products, **Kerrigan Iron Works Co.**, Nashville, Tenn., wholly owned subsidiary of Rockwell-Standard Corp., is installing machinery and equipment for making seamless round-tapered aluminum light standards. C. A. Cooper, vice president of the parent firm, predicted that this expansion will permit Kerrigan to get a larger share of this growing market.

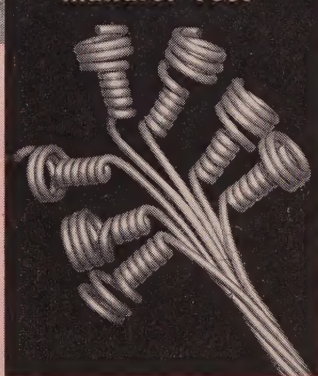
Syntron Company has announced that they have begun construction of a new manufacturing plant for silicon rectifiers that will increase production eight times the present capacity. Site of the new half-million dollar plant will be Homer City, Pa.

Crapo
GALVANIZED

STEEL STRAND



Mandrel Test*



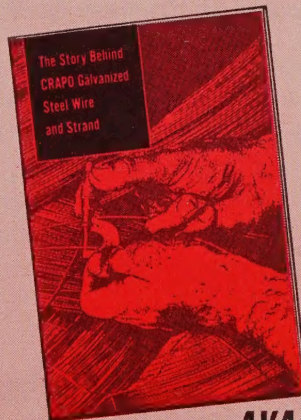
Checked and Double-Checked by Laboratory Technicians

Every coil of wire used in the manufacture of *Crapo Galvanized Steel Strand* is tested and approved by trained laboratory technicians. Samples from both ends of each individual coil are subjected to a series of prescribed tests before stranding. Then, the finished strand is re-checked to make certain that it conforms in every respect to established specifications and our own high quality standards.

Thus you know when you specify *Crapo Galvanized Strand* that every precaution has been taken to assure maximum performance in the finished product.

Write for Free Booklet

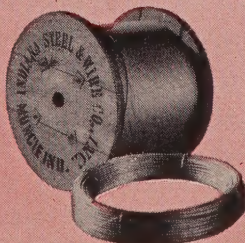
"The Story Behind *Crapo Galvanized Wire and Strand*" illustrating and describing manufacturing techniques and testing procedures. Ask for Booklet B-59!



AVAILABLE IN 3 COATING WEIGHTS

FOR GUYS, MESSENGER AND OVERHEAD-GROUND WIRE

Crapo Steel Strand is available in all standard sizes and grades and in Class A, B and C galvanized coatings. Class B coating is twice as heavy as Class A coating; Class C coating is three times as heavy.



*Determines ductility of wire and adherent quality of galvanizing.

INDIANA STEEL & WIRE CO., INC.

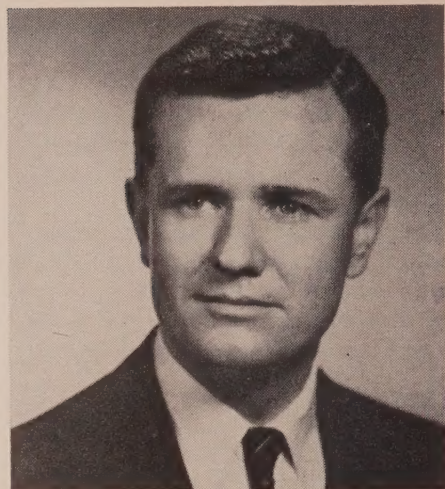
Muncie, Indiana

MEN OF



POWER

Name John T. Jackson V. P. Of Remington Rand



John T. Jackson

John T. Jackson becomes vice president—management planning for the Remington Rand Division of Sperry Rand Corp., according to a recent announcement.

Mr. Jackson has been serving with International Telephone & Telegraph Corp. since 1953 as assistant to the president and director of planning and organization. In 1959 he was elected vice president. Previously he had been vice president and director of George S. Armstrong & Co., industrial engineers and management consultants.

Kaiser Industries Appoints Havas V. P.

George Havas has been appointed vice president and director of engineering of Kaiser Industries Corp., it was announced recently by Edgar F. Kaiser, president.

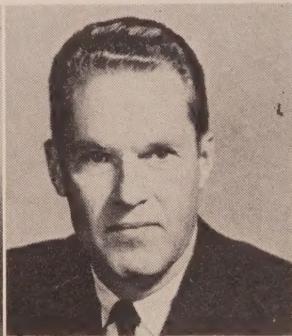
Associated with the various Kaiser companies since 1928, when he joined the Kaiser Paving Co., as office engineer, Mr. Havas served as chief engineer of Henry J. Kaiser Co., after 1935 and became vice president of the company in 1945.

Since joining the organization, he has figured prominently in all the various engineering and construction jobs of the Kaiser companies, including the Hoover and Bonneville Dams. From 1945 until 1958, he was directly responsible for all Kaiser engineering and construction.

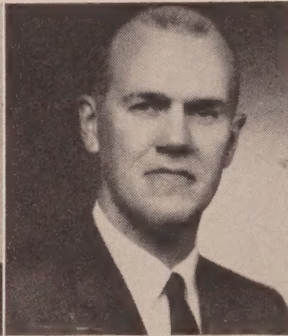
Stone & Webster Elects Three Vice Presidents



Wilbur S. Roberts, Jr.



Theodore E. Casselman, Jr.



J. Marshall Hamill

Stone & Webster Engineering Corp. has elected three vice presidents, according to announcements by F. W. Argue, president. The new vice presidents are Wilbur S. Roberts, Jr., manager of new business activities; Theodore E. Casselman, Jr., manager of the firm's New York office; and J. Marshall Hamill, administrative assistant to the president in the Boston office.

Mr. Roberts, a graduate of Union College, joined Stone & Webster in 1941 and was loaned to the War Production Board in Washington during World War II. From 1949 through 1953 Mr. Roberts was assigned to Great Britain to assist with the construction of petroleum refining facilities. He has headed new business activities for the company since 1958.

Mr. Casselman came to Stone & Webster in 1940 as a project engineer in the Boston headquarters and was made an assistant engineering manager in 1957. He is a graduate of the Massachusetts Institute of Technology and a member of the American Society of Mechanical Engineers, the American Institute of Chemical Engineers, and the National Society of Professional Engineers.

Mr. Hamill, a graduate of the U. S. Naval Academy, joined Stone & Webster in 1946 following service in the Navy in World War II. He has worked on the design of chemical and petrochemical plants in Great Britain and various parts of the U. S.

Toledo Edison Names W. A. Marshall Senior Vice Pres.

Toledo Edison Co. recently designated William A. Marshall as senior vice president. He was formerly vice president and secretary of the company. John P. Williamson, assistant treasurer, was elected at the same meeting to succeed Mr. Marshall as secretary.

Mr. Marshall will continue to hold responsibilities in the field of accounting and finance. Mr. Williamson will continue as assistant

treasurer and in addition to his secretarial duties, will direct methods and procedures, purchasing and claims, and real estate activities.

Joining Toledo Edison after post-graduate work at St. Louis University, Mr. Marshall rose from positions as assistant secretary in 1927 to become the company secretary and treasurer in 1949. He was elected to the board of directors in 1950 and v. p. in 1957.

tion activities throughout the United States and around the world. In 1958 he assumed the position of general manager of the company's heavy construction division and the international subsidiaries.

MEN OF POWER BRIEFS

A.V.K. Babcock, area development manager of Arizona Public Service Co., will one of three businessmen on the first U. S. Trade Mission to Afghanistan and Iran August 20 through October 8. Purpose of the trip is to "strengthen relations with the two nations by exploring and developing new and mutually advantageous ties."

Two electrical distribution superintendents have been appointed by Saskatchewan Power Corp. They are **James M. McConnell** and **S. H. Bock**. Each will be responsible for eight district superintendents, and together they succeed Karl W. Allcock, who had been in charge of the 16 superintendents since January 1959.

Detroit Edison's new manager of operations is **Lemore W. Clark**, who moves up from assistant manager to succeed **William W. Williams**, retired on August 1 after 39 years of service. Mr. Williams has had responsibility for direction of nine operating departments with 4,500 personnel since 1952.

Retirement of **Charles C. Yeakley** as superintendent of the Oklahoma Gas & Electric Company's Eastern Division has triggered the promotion of two OG&E men at Ada, Okla. **Norborne C. Auld**, Ada district manager, becomes the new superintendent of the Eastern Division. He will be replaced as Ada district manager by **J. B. Lynn**, Ada district accountant.

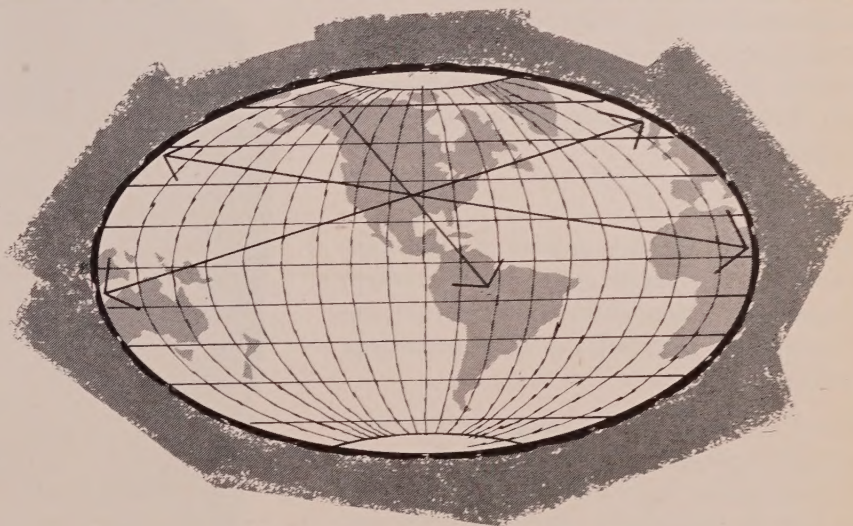
Virginia Electric & Power Co. has announced a number of personnel changes. **Stuart C. Will**, manager, Altavista, Va., becomes manager, Williamsburg, Va., replacing **L. L. Bond**, recently appointed assistant director, Industrial Section, Area Development Department. Replacing Mr. Will is **Walker H. Newcomb**, manager, Crewe, Va. **C. T. Lucy, Jr.**, super-

visor—employee training and information, is the new manager at Crewe. Replacing Mr. Lucy is **William L. Maner, Jr.**, executive assistant at Richmond. **John K. Taylor**, superintendent—service, at Norfolk, will succeed Mr. Maner.

Peter R. Beament, engineering assistant at the Virginia Electric & Power Company's Chesterfield Power Station near Richmond, has been assigned to the Carolinas-Virginia Nuclear Power Associates, with headquarters at Charlotte, N. C. After receiving nuclear

energy training with CVNPA, Mr. Beament will assume responsibility for operations on one shift at the Southeast's first atomic power plant now under construction at Parr, S. C.

George B. Brown, vice president of Joslyn Manufacturing and Supply Co., has retired after 25 years with the company. He moved to the Chicago office of Joslyn in 1955 and was later named vice president-manufacturing. His successor was named earlier (see March 1, 1960 EL&P. p. 87).



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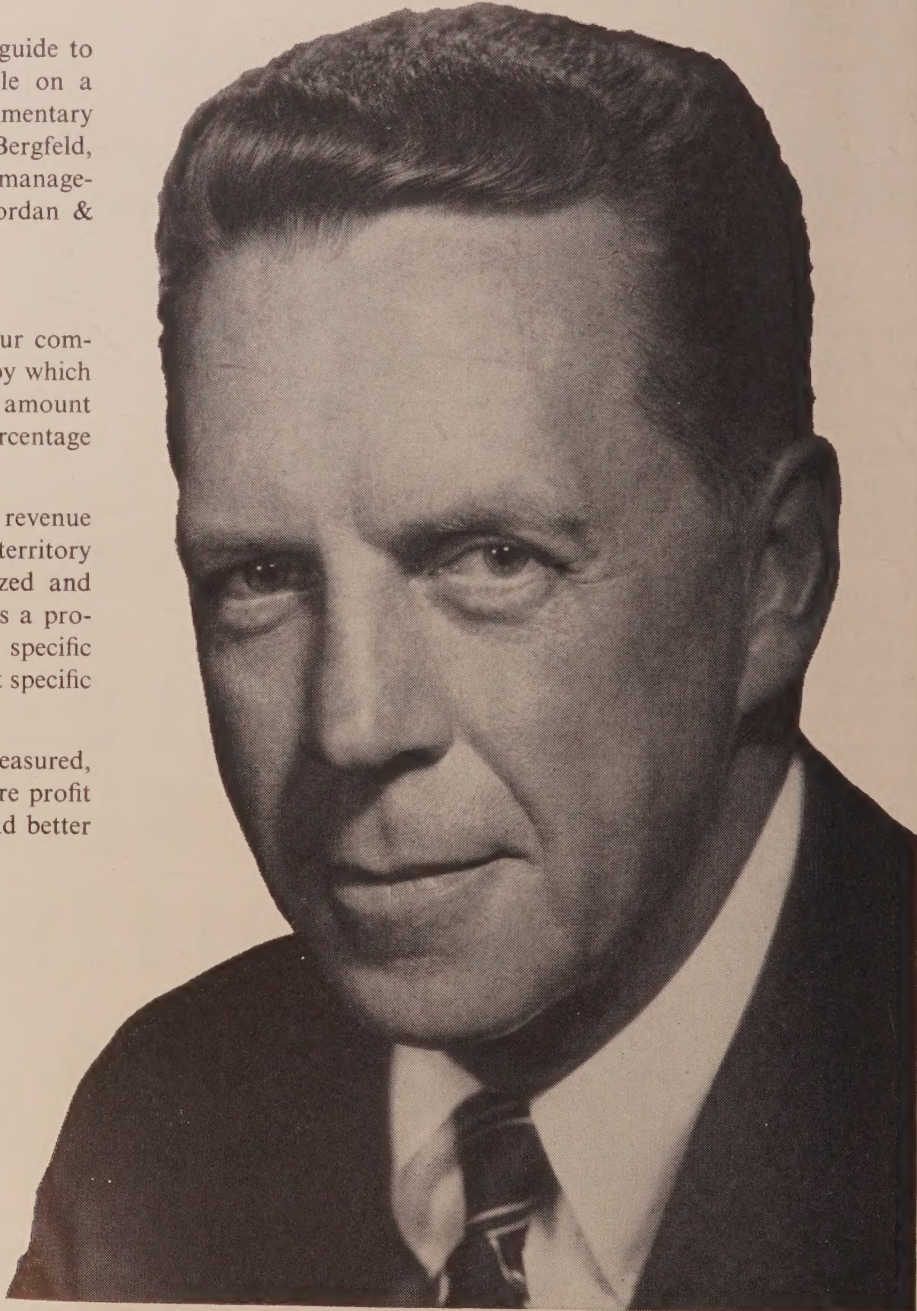
“What’s so bad about basing the ad budget on last year’s shipments?”

Management men, seeking a reliable guide to advertising appropriations, often settle on a percentage of sales. The following commentary on this practice was written by A. J. Bergfeld, President of the internationally known management consultant firm of Stevenson, Jordan & Harrison, Inc.

“Past practices of your own or of your competitors will produce no magic ratios by which you can either judge or budget the right amount of advertising automatically as a percentage of past sales.

“Plans for increasing sales volume, sales revenue and resulting profits by product and by territory or by divisions, can better be analyzed and approved by considering advertising as a programmed cost to be associated with specific profit plans and to be measured against specific results.

“Programming advertising costs as a measured, reasoned and integrated part of a future profit plan usually results in a better plan and better actual future profits.”



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